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WHITNEY SOUTH SEA EXPEDITION

of

THE AMERICAN MUSEUM OF NATURAL HISTORY

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Extracts from the Journal of

ERNEST H. QUAYLE

Assistant Field Naturalist

Book I through Book XII

September 14, 1920--March 27, 1921.

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BOOK 1.

Voyage from San Francisco to Tahiti

Sept. 14--26, 1920.

Tahiti, Sept. 26--29, 1920.

September 14, 1920.

Sailed from Pier 33 on S.S. 'Marama' at 12 M., Sept. 14. Entered fog bank just outside the gate, and have been going through light banks ever since, with comparative clear spaces intervening. So far, the journey has been quite smooth, with only occasional rolling spells.

California Seagulls followed in considerable flock. Still with us when we entered fog at 12:20, but less in numbers. Several were following at one o'clock, but, when I came out from luncheon at two, only two gulls were left, and they remained behind to clean up some garbage dumped overboard.

At nine miles out we saw some blackish birds skimming over the waves, which, Mr. Beck informs me, are Shearwaters.

2:20 P.M. A shag flew away from the port bow. I could not detect any peculiar markings, so suppose it was the common Brant's Cormorant.

A light fog prevents us from seeing the Farallon Islands.

This is the most marvelous contentment I have ever known.

How much better to be well and feeling independent than sick and in the service! Mr. Beck says we will not start to work until we get our sea legs, a few days hence. But I have observed every bird yet seen, and if the fog were not so bothersome would, no doubt, see more. With tense anxiety I await the arrival of our first albatross. Wallace gave me several things to watch for; he said the gulls followed half way to Hawaii, but I doubt that. Now to enjoy the sea for the rest of the afternoon!

At 33.36 miles there were some small, mostly white birds, with long sharp narrow wings, flitting about at some distance away. There was also a Cooper's Shearwater, or Tern, and a Shearwater Sooty (Puffinus fuliginosus).

At 36 plus miles a Nereocystis was floating here, so far away from its moorings. After this, I saw no birds for a long time.

4:50 P. M. I saw another small flock of Shearwaters. I watched them for several minutes, and observed them soaring gracefully within a very few inches of the water. However, I never noticed any in the act of scooping it with their lower mandible.

A lady sitting here just saw a whale, and two men saw him later, but he did not spout again. There was a larger bird than a gull off the port stern, but I could not make much of it, even at 10 P.

At 52 plus miles, two albatross followed half an hour to this point. Here is my first thrill. I've seen the bird far-famed in nautical lore. I've watched him glide on outstretched wing, but no more still than gulls. He has about half again the spread of our common gull. The two birds are apparently mates because, when one lit upon the water, the other came into view from the distance and alighted peacefully beside the first, and there I last saw them,

floating at ease upon the billowy waves. Now they are following us again, so I must gaze, enraptured at their gracefulness. These were the Black-footed Albatross (Diomedia nigripes). These two were later joined by a third, and were following the ship until I went below at sunset.

At 67 plus miles, we saw three small snow-white birds (Phalaropes), Mr. Beck says.

September 15

Awoke with the break of day. The first night has passed with everything splendid, as far as I am concerned. No tendency to become sick, and two hearty meals devoured ravenishly. May my sea-legs last throughout the voyage!

155 plus. 7:25 A. M. One albatross (Diomedia nigripes) is on the job this morning, gathering up the garbage. Change clocks back 26 minutes.

185 plus. 9:18 A. M. One albatross resting upon water in our wake.

190 plus. Still have one albatross. He lights when he finds food. Once remained upon water while we traveled .2 of a mile, later while we went .3 of a mile; is up with us again, crossing and recrossing our stern in wide sweeps. He must be traveling more than five times our speed, and occasionally gets disgusted with our slowness and circles far in the rear. Now he has stopped again.

192 plus. A small tern, flitting rapidly and swallow-like, crossed the stern and circled the vessel. I could not catch any details because of rapidity of his flight. He was about size of a bluebird, with long and narrow wings, grayish back, white beneath.

196 plus. 10:07 A. M. Two heron-like birds, large as our Sandhill Crane, came up to the ship; they passed us, then turned back North-eastward.

204 plus. 10:40 A. M. The two herons again came over the ship, and again returned eastward. Have not seen an albatross since ten o'clock, but there is one about a quarter of a mile in the rear now. I guess he is merely occupied eating up all that has recently gone overboard.

223.6. 12 M. Run 335'. Lat. 32° 51' N. Long. 125° 17' W. Two albatrosses (D. nigripes) picked us up about 12:45 (10 plus), and followed, gathering food.

37 plus. 2:26 P. M.

40.5. One albatross (D. nigripes), with white feathers under tail. Later he dropped back and another appeared, prominently whiter about head, not below tail. Later, both present at once.

77.7. 5:20 P. M. White face alone present.

90.6. 6:15 P. M. No birds in sight.

115. 8:10 P. M. Had it not been for the albatross and herons, to-day's journey would, indeed, have been sea and sky. But such a beautiful deep navy blue sea it is! And such a clear empereal blue sky, with flecks of clouds all day, and a rather close canopy of them towards evening!

In spite of the scarcity of bird life, I spent most of the day with the glasses observing the flying actions of Diomedia nigripes, and just watching the waves. I actually believe that the motion of the waves alone is sufficient amusement for me, even on a twelve day voyage. Either where the propellor churns up a frothing wake, or where the bow cuts V-shaped waves in the clear rough surface, or even

alongside amidships there are to be seen certain coordinations of motion that are pleasing to the esthetic tastes of the artist. Waves exhibit the very poetry of motion, and I guess, next to love and spring, is a most important inspiration to poets. Too cloudy to observe the sunset tonight, and there are no stars in sight.

Aboard we have a very peculiar passenger list, as a whole. The most interesting portion is the Bremmer family of seven children under eleven years of age. They are about the best behaved children I ever did see, always jolly and full of play, with never a cross word or sign of peevishness, nor selfish quarreling among them,--children requiring no chiding from their parents, simply well-bred, that is all there is to it. There is a decided dearth of young ladies aboard, the liveliest being three in the steerage. I meet them on the stern deck.

September 16

Up at six, and eleven times around the deck at a brisk run. My swimming suit makes a fair track outfit. Then a bath, and now feel fit for the day.

6:25 A. M. 269.3. Changed back twenty minutes. No birds in sight. The deck aft looked wet this morning, and on every side rain clouds hang low. The sailors are swabbing down the deck; the younger fellows in boots, while an old gray-haired salt has his legs bared to the knees. A rainbow off the starboard stern proves that rainstorms are to be expected now.

7:30 A. M. We are already in the rain belt of the Pacific. It is quite a restful change from California's dry summer and the fogs of San Francisco and P. G. Showers, sunshine, deep blue water, clear blue sky, with rolling cumuli, shadowed under-

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neath,--beautiful and pleasant "sea-nery."

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338. 12 M. Lat. 27° 49' N. 128° 13' W.

65.2. 4:30 P. M. One albatross (D. nigripes) present.

5:50 P. M. The sun has dropped behind a wonderful cloud, low-hanging, thick and of a purplish dark blue, fringed above with bluish white fluffy rolls, and a small border of sunset gold. Below the horizontal line of the cloud, is a series of more distant ones, marvelously tinted in the golden light, while streaks of darkness reveal where rain is falling this side of the lighted area. There is a stage setting of successive scenes that would do well for salty ballads,--a phantom ship being added in the brilliant glow.

I have watched for the albatross since seeing it at 4:30. Early in the morning we will be beyond the southern-most record of D. nigripes.

I spent two hours with Mr. Beck after dinner, talking over our expenses and salaries; the result is that I have thirty dollars, nearly, for spending these first six months. Then I'll draw five per month.

88.7. 6:10 P. M. Sunset.

September 17

271.8. 6:55 A. M. Clocks were set back 10 minutes at midnight. This morning we are approaching the Northern tropic. I found that twelve laps of the deck made a mile, so ran that distance before bathing.

9:15 A. M. We have crossed the Tropic of Cancer. Saw a

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flying-fish in our wake, so came forward to watch for them off the bows. Saw a tern, or petrel; he hardly held his beak downward. Also saw two more flying fish, but they have not as yet become numerous. So hot that I am going to shady star-board side.

329.4. 11:01 A. M. Tropic bird, provided they are white and near the size of a gull. Mr. Beck saw the little gray bird off the port side this morning, and pronounced it a shorebird.

336. 12 M. 22° 39' W. 130° 38' W. The clocks are retarded ten minutes at 12 P. M.

The afternoon I spent mostly below, going over the bird-notes and snoozing. Also a considerable portion conversing with passengers, especially with the Murrays, who are compatriots of Grandfather's from the Isle of Man. They had seen my typically Manx name in the list of passengers, and have been inquiring about me since. The chief engineer pointed me out to them to-day. Mrs. Murray is an ardent member of the Manx National Society, and has looked up all Manxmen throughout her travels.

For the evening I perused a portion of "Coral Reefs", by Charles Darwin, and conversed again with two of the O'Donohugh sisters. Retired at ten, as usual.

September 18

Up at the break of day, and around the deck twelve times, in spite of sore leg muscles. Coming upon deck, I met Mr. Beck, who announced many birds, Tropic birds, Shearwaters, a Booby, and also flying-fish. They say one flying-fish jumped upon the lower deck this morning. Well, that's what I get for staying below.

I saw five Tropic birds and some Shearwaters when I came up at eight,--a Shearwater, white beneath, mottled gray above, and

about the size of a robin, or a little larger. Tropic birds, "Bo'sun", are quite prominent this morning. The sun is quite warm early in the day now. A beautiful bird, this snow-white rover of tropical seas, with his black legs, a black lores, yellow bill, and that characteristic bo'sun feather in his tail. Nine of them were just now playing about for Mr. Murray's and my especial benefit.

344. 12 M. 17° 28' N. 133° 14' W. Tropic birds flocking around, and a goodly flock of Shearwaters a fair distance from the ship, port side at 4:30.

The afternoon went quite uneventfully. There were plenty of Bo'suns, and a few flying-fish.

September 19

Saw a few Bo'suns and a few Shearwaters and flying-fish. It is noticeably hot this morning, and everyone who possesses white cotton is wearing it. At ten o'clock we passed a considerable flock of Shearwaters. There are very few flying-fish being flushed today.

337. 12 M. 12° 22' N. 135° 41' W. Saw a large school of porpoise off the port bow at noon.

September 20

Saw some new Shearwaters today, and one Tropic-bird resting upon the water.

317. 12 M. 7° 31' N. 137° 50' W. School of Dolphins off port side, quite entensive, not very numerous. Also two black Shearwaters. My main fault here in the tropics is an unlimited laziness. I cannot get enough slumber.

A heavy shower this evening.

September 21

Was a little late in rising this morning, and so missed my run because the sailors were swabbing down the deck. I skipped the rope awhile, and then decided to enter the medicine-ball game. It was quite strenuous, but they were easy on me. Got bumped once on the head, once on the nose, and once on the jaw; succeeded in tagging the big chief engineer three times, which was quite satisfying; also got the Captain once, but he succeeded in slipping the ball through my legs, and got me a nice horse laugh.

Saw but few birds today, mostly Shearwaters. The Southeast trades are blowing briskly, so that our day approaching the equator was fairly comfortable.

328. 12 M. 2° 37' N. 140° 15' W. After pitching quoits at length, I entered a game of deck tennis with the lady champion, Miss Parker. She plays a very lively and energetic game indeed, and certainly should walk away with the ladies' singles tomorrow. Beck is very efficient in the games, as a whole. My pardner in tennis, mixed doubles, is a French-Tahitian girl, named Auffray, and a very good player.

A very choppy, turbulent, splashy sea, but no great swells. Poor Mrs. Beck! It is certainly unfortunate that she is not a better sailor.

September 22

The line is crossed,
By the waves we're tossed
Into the Southern Seas.

Our two days nearest the equator, and most directly beneath the sun,

have been wonderfully cool and fresh, owing to the stiff southeast trades that are blowing. We crossed sometime after midnight, and, strangely, there appears very little difference in anything.

354. 12 M. 2° 37' S. 142° 59' W. A record run for the Steamer "Marama", and certainly for this voyage. At this rate, we will arrive at Papeete early Saturday.

September 23

23. 347. 12 M. 7° 59' S. 145° 8' W.

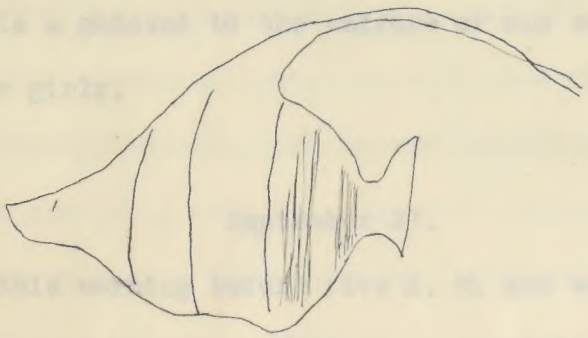
September 24

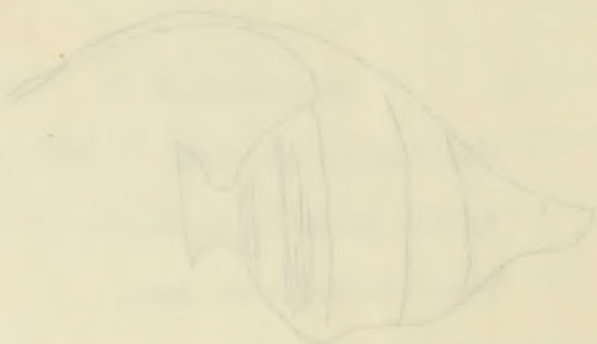
24. 347. 12 M. 13° 18' S. 47° 27' W.

September 25

4 A. M. One hour to write letters, then on top side to observe the approach of that fair Island of Tahiti.

Tahiti Dock: We are waiting with our baggage while Mr. Beck makes hotel arrangements. I am tempted to cease this journal and observe the Starlings (Mynas) so plentiful about here. There are seven Myna birds wading in creek mouth at lagoon. Beside the dock, where we can see, there are several marvelously colored fish--blues, black and white, greens, browns, yellow and black.





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Arrived at Papeete about seven this morning. Went ashore about 9:30, and had baggage trouble until three. Went strolling with Messrs. Storey, Shackelford and Ohler and Miss Lane down the road and back beach. Met a Mr. Gooding, smuggled beneath flowers along shore of lagoon. Went aboard, bathed and remained on for dinner.

September 26

Papeete, Tahiti: Awoke at four, and, with Mr. and Mrs. Bremner, took in the market. Well, these natives do stir around all right, and with the crowing of the cock, at that. Market is cleaned up by the time the sun gets fifteen degrees high--one hour. Went to wharf and watched the boat pull out, and also remained to watch the 'Toofu' arrive. Took photographs. Noted fishes. Then I came to the hotel and slept, in spite of drunken carousing in the next room.

Awoke at noon, not knowing that meal hours were from 11 to 12. Had lunch with Beck, and then rode out to Papenoo River. The ride impressed me with the marvels of the island. One or two months will pass all too quickly. Wrote cards and letters all afternoon and evening until ten o'clock.

The drunkenness I have seen convinces me thoroughly that our prohibition is a godsend to the welfare of our country, and to the safety of our girls.

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was not to sail until ten o'clock, so returned and wrote three letters.

Had breakfast with myself, and then walked down to wharf, adding a letter to Ferris. A lad had pulled some sea urchins ashore, and, surely enough, in place of tube feet, they had dorsally pointed weapons. They were very highly spotted with greenish body and black and white spines. Another variety has enormously long spines.

Worked on labels until the Becks wanted to go down to see the boat off and asked me along. A native girl--or at least half native--was leaving. She and another girl, who was apparently a sister, were dressed in a creamy orange, which certainly goes well with the chocolate brown skins.

Came out to the lagoon for a swim. The bathing suit is ample costume for this climate, though the natives got lots of fun out of my uniform,--tennis shoes, bathing suit, field glasses in case, spectacles, and a towel over my shoulder. Loitered around in the lucid water, looking at the corals and sand on bottom for awhile, and am now basking in front of the thatched bath-house on a mat, where very diminutive ants and pesky flies are bothering the life out of me. Wish I had a canoe to take in the inner edge of yonder barrier reef.

Came back to the hotel, where I put in 3/4 of an hour of work. After supper, we watched two lizards catching insects in the neighborhood of the electric light. There is one sleek and fat one, and a smaller, more linear one, the latter being much afraid of the former, but both appearing well fed and quite satisfied with life. Some beautiful brown-orange spotted moths. Sleek-sides licks his face, even as high as his eyes, with an active red tongue. Here

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comes another sleek one, but he has retreated to his hole. Here comes little Slim. Sleek-sides washed off his paws with his tongue. Sleek-sides II. has entered the ring, and little Slim has summoned more courage.

There are four artists here at a table; one young blood is quibbling over the meaning of disgust. He only gets disgusted with dead rats. They certainly have a freedom of discussion amongst them. He says he must be more of an animal, because he cannot get disgusted at a drunken friend,--even a dog would get disgusted at a stinking rat. Guess again, young artist, guess again! The dog would go and roll in the dead rat. Well, now they are on love and passion. The woman is much the most sensible in her arguments. Inhibitions are too prevalent in America. Well, they do a little good, anyway, for I'll bank America, now that prohibition has gone into effect.

Sleek-sides II strikes out across the ceiling after an insect, and he certainly gets them. Little Slim is at the light, filling himself on the moths that hover about the flame. The lizards promise well to take their own time about dining. The artists have ended their wine-talk, and have gone for a walk. Well, it will do them more good to get a little exercise than to get nowhere in their rambling discussion.

The Orientals have taken over the business commercial of this Island, and I understand that it is the same through out the South Seas. "Damn the Chinese!" said a native lady, "They are too many. Too many!"

September 28

Awoke at five, and later at six. The orange peel, placed on the window sill last night, has attracted some fruit flies this morning. I wonder if they are distinctive, or a cosmopolitan red-eyed, gray-bodied Drosophila. I should send some to Sturdevant, I think. There is also a very small ant, which greatly resembles the Argentine ant in actions. He is but 2 mm. long, and very prevalent. Am going out this morning for three hours of observation and attempts at photographing the Mynah bird, which was recently introduced by one pair of birds, and now covers the island at this elevation.

Came out to the second bridge east of the hotel, and set up the camera in a fairly exposed place, but am not going to have much success today; will leave them the bait to eat at their leisure, and will return tomorrow morning, if nothing else turns up. They are quite cautious when a person is watching them, although they seem perfectly indifferent about the passers-by, who never bother to look at them. Saw some weaver birds, and I believe white terns, flying about south-westward. Hoping my notes are sufficient to earn my hire, I am going to break up the camera now, and go back to the hotel.

Went down to the Police Court and registered. Came back and ate lunch,--breakfast, they call it, from 11 to 12,--a meal of three courses and fruit. We had some alligator pears, which, if fixed up right with sugar, lime juice and salad oil, are very delicious indeed.

My room adjoins the Chinese National League, and every afternoon, apparently, the children gather to play. Any childrens' play-ground is a noisy place, but a Chinese one takes the prize. The little fellows get fearfully enthusiastic over everything they play, especially a football game. They are diligently applying

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themselves to a study of the English language, as the men do every evening until ten.

September 29

Spent the evening upon the labels, obtaining a speed of one hundred in less than an hour. This morning, finished them, with one hundred more. After breakfast, came out to try once more for a picture of Mynah. The Natives here are entirely at a loss to know what I am doing, and not expecting them to understand English, I have not tried to enlighten them. Today I am well hidden behind some tall grass, used here as the hay for the poor diminutive horses. The banana bait I left yesterday had disappeared this morning, with no pig tracks near, and there were some birds in the neighborhood when I set the camera. None have appeared since.

One thing that should be recorded about Tahiti is the number of flies present, just what one would expect, with horses, pigs, and unsanitary sewerage. Wasps seem next in abundance, unless the mosquitoes probably equal them. Then comes a little blue beetle.

The hotel proprietor's wife being an efficient maker of straw hats, has promised me the next one she makes, at 25 francs, less than two dollars. They are very light and artistic, but whether as durable as Panamas or not, I do not know.

Two birds at the end of the bait line, but so wary about the banana that I would say it is not the proper bait. But the bait is all right; the bird is simply cautious about the set. Some of them went close to the focus line, but only to grab a piece of bait and run. They resent my looking over the grass at them. They are quite like chickens, in that, if one gets a bit of food they com-

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mence running after him, possessing a run not quite like a quail, yet very speedy. As walkers, they are rather high steppers, resembling the blackbird in that respect. They very seldom hop, and then only to get over, or upon, small limbs lying upon the ground.

What a wealth of patience is required for this kind of work! Mr. Beck says, more than he possesses, but, as it is a fundamental part of our work, it must be done. So, while we are not busy at something else, I suppose I shall be permitted to try for pictures. I must devise better methods of attracting the birds, or else, not try to get them so close to the machine. As for the patience, it takes a lazy man physically, and one who has plenty of play for his mind. Given a shady tree, paper and pen, I'll sit in one spot half a day, without becoming restless. Taken all in all, I believe this work is going to thoroughly satisfy me.

We are to make up the skins completely in the field, excelsior bodies, and mounting. Of course, the form is simply that of a dead bird lying flat upon its back, but, even in that, they must appear as natural as possible. As soon as we get out the materials, I am to commence practicing upon the Mynah bird, which is supposed to be about the best size for a beginner. They are so plentiful here too, that one can well afford to waste one or two in practice.

Mrs. Beck has about decided to don her outing togs and become a collector too, in spite of her inability to stand the sea-life. Rather than remain behind in Papeete, she thinks she would prefer being seasick. Well, it will hinder the exploring to a certain extent, but I suppose she will more than earn her keep, cooking and helping with the skins. She suggested that I find out

whether or not my intended can stand sea traveling without being sick most of the time, for, if I intend to carry on this work, that will be a very serious handicap. It would hinder a little, no doubt, but not so much as a lack of interest in the world, or some particular phase of life.

BOOK II

Tahiti

Sept. 29-Oct. 11, 1920

Coral Reef, Sept. 29.

I wanted to start this journal out here just behind the barrier reef of Tahiti, but I am afraid it is going to prove just a little bit choppy. How interesting it was to be within twenty feet of the breaking surf, and yet be perfectly safe in a little dug-out canoe not wide enough for a man to sit down in! There is a safeness that is remarkable in these little out riggers, and the lightness of them is even more noticeable. Even when broadside to the ripples of the lagoon, only a slight rocking occurs.

A large black hawk and two terns just flew over. The terns are larger than the ones noted alongshore, and have the tips of the wings dark, appeared gray above, but could not see very well.

To attempt a description of the bottom of this lagoon would only be futile. The most noticeable feature is the sudden drop off from the shelf which extends out from the shore almost within reach of the paddle, half way to the reef. Beyond, is deep blue water. Then half of the remaining distance it again becomes green, and gradually grows shallower, until just above the reef is a belt, say 100 feet wide, that is less than two feet beneath the surface, and I believe it is about high tide now.

Spent more than an hour out there, and told the native

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I'd be around in the morning, which I hope will produce calm weather and ample observation time. Tried walking along the coast road barefooted, but at the first ditch, I washed my feet and put on my shoes. Am now listening to a Minah bird singing. Tried to get a native to tell me about their nests, but he couldn't understand. Here is one which varies his song almost as much as a thrasher. He resents close observation, however. Their singing reminds me of a young boy who has learned about a dozen different twists to his whistle. The music is there, but the composition is very poor indeed. It certainly is not for want of effort, for if ever bird tried hard to sing, I'll say these fellows do. There is one now with a run of trills equalling the thrasher, but he cannot follow them up with others. The choppiness of his singing is quite jay-like and harsh, the tones themselves being not unpleasant.

The small crabs,about three to four inches across, take fallen leaves into their burrow,—just saw four doing so. Why? Have just watched this performance again, and upon throwing green leaves over, they quickly pounced upon them and dragged them into their holes. Do they eat them, or build houses with them for lining?

The lagoon is full of little fish, which feed upon the surface with the effect of a rainstorm. The slightly larger ones make a considerable splash when one approaches.

A native vehicle just went by, and, as I have before observed, a lady (native) was in front driving, while her apparent lord and master rode at comfort in the rear seat, occasionally with children.

Saw a young lad preparing to indulge in the luxury of a drink of green cocoanut milk. I went over and knocked two cocoanuts

out of a tree for him. He set to work shaving off the casing with a butcherknife, but upon reaching the nut, I gave him my jack-knife which perforated the hole more easily. He then offered me the first one, which I of course accepted, about half the juice being sufficient to satisfy me. When I get accustomed to it I will be able to indulge at greater length. Had the two children go over into sunlight, and there took a picture with the youngest drinking. Cocoanuts and sugar cane are to these young boys what watermelons and apples were to us in the States.

On a tall grass somewhat resembling our nodding brome I found an Aphia, Homistera, and the larva of something which resembles the anthin, but climbs about plants.

September 30

After the numerous barnyard fowl had been crowing for some time, one Myna piped up at 5:05, but no others have been heard, nor did he sing again for several minutes. There are some now in the distance.

By the great chorus of chanticleers, I take it that the common chicken is as thick, or thicker, than the Chinese residents.

Lagoon: Came out this morning, and securing the canoe am now out in the lagoon studying Coral Reef ecology. The water being a bit lower than yesterday, I can anchor the boat by putting my bare foot upon the higher parts of the corals. The sun has just risen above the clouds, and the play of the light upon the marvelously colored corals is certainly worth missing a breakfast to behold. How beautiful the corals are beneath the water, and how dull and uninteresting above it, and dead!

Saw one tern this morning, and an Holutherian, which, upon

out of a tree for him. He set to work shaving off the coating with a potsherd, but upon rending the nut, I gave him my jack-knife which perforated the hole more easily. We then offered me the first one, which I of course accepted, about half the juice being sufficient to satisfy me. When I get accustomed to it I will be able to imbibe at greater length. And the two children go over into sunlight, and there took a picture with the youngest drinking. Cocoanuts and sugar cane are to these young boys what watermelons and apples were to us in the States.

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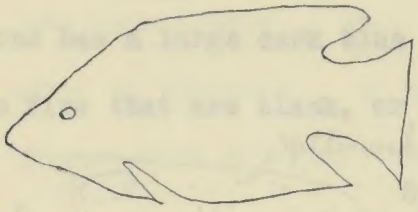
Saw one tern this morning, and an Oystercatcher, which, upon

disturbance with my paddle, viscerated in a manner which would have pleased May.

Holding the canoe on the edge of the inner reef, I have on the one hand shallow water, and on the other the deep blue. This is a marvelous place to observe the fish swimming around the coral ledges below me. In and out of caverns they dart and up near the boat--a richly tinted orange and black one is there beyond the point. The majority are blackish, with a very pig-like snout.

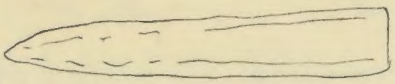


Some are black and white striped lengthwise, others crosswise. Most of them are narrow. Here is one with a rough band of white just forward of the tail--good camouflage.

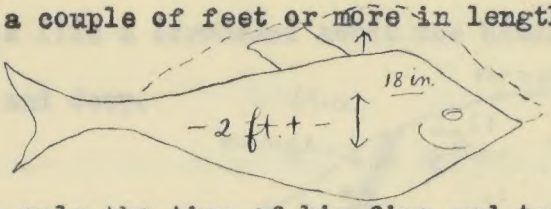
A shove on the rocks and a short drift to an almost complete change where the water is about four or five feet deep, with lumps of coral standing up in it, on one of which I drop the starboard anchor. Here small orange fish predominate, and as I write, from a cavern in the blow below the anchor comes a very spotted fellow, very broad between the eyes. The little orange fellow has black eyes and fins.

Again above the precipitous and even underslung ledge, with the deep blue void to starboard and the port anchor a little more than ankle deep, clinging to corals. There,swimming about a projecting point, is a small fellow black afore and white aft.

And there is a long slim fellow, dark amidships, with two shimmering strips of blue and silver.

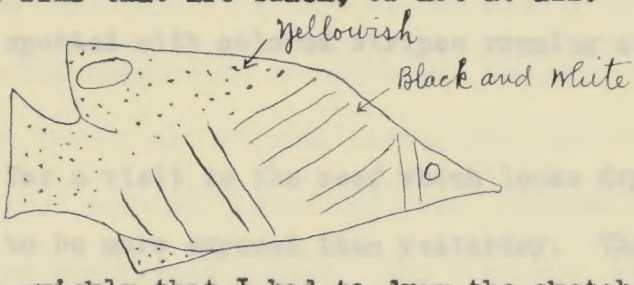


Here a small striped red and black one. Far below are the shadowy forms of large fish a couple of feet or more in length, quite numerous.

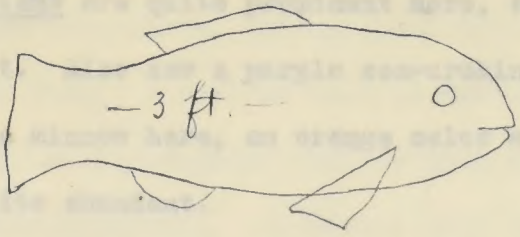


Here is another with only the tips of his fins and tail white.

The orange one has a large dark blue eye, and it is only the outer edges of the fins that are black, or not at all.



He passed so quickly that I had to draw the sketch after he had gone, but that was the impression he gave me. The camouflage was excellent. He isn't quite so whalish in appearance, but sure looks like fifty pounds and chubby.



It is almost enough to make a man dizzy gazing down into this abyss, with the disappearing ledges to reveal its real depth.

The common little blue fish must not be overlooked because he is so plentiful.

And there is a long silk fellow, dark amaranth, with two shimmering
stripe of blue and silver.

Here a small striped red and black one. Far below are the shadowy
forms of large fish a couple of feet or more in length, quite immovable.

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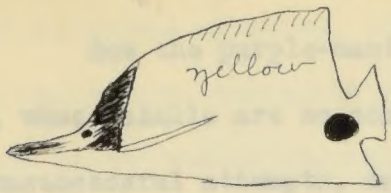
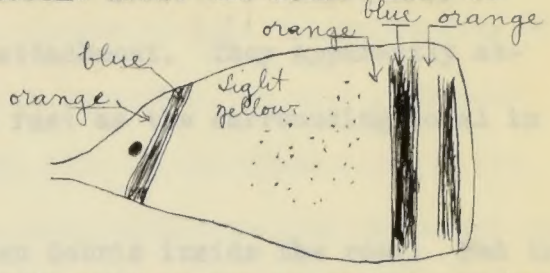
Yellow with more black spots and more graceful lines.



Looks for all the world like a cormorant about the head. Most of these fish are narrow and deep.



One just passed which I will neither try to sketch nor describe--seeing alone is believing. He was more perch shaped than the rest, and spotted with colored stripes running caudad from his head.

Now for a visit to the reef which looks dry from here. At least appears to be more exposed than yesterday. The seaweeds show plainly above the water.

The Reef--it was so well exposed that I could ground the canoe and wade about safely. Took camera and photographed it several times. Holothurians are quite prominent here, but I have not yet seen a sea-rabbit. Also saw a purple sea-urchin, but no starfish. There is a little minnow here, an orange color with sub-dorsal blue bands. He is quite abundant.

While gazing seaward at a tern, I saw a butterfly. What streak of wanderlust led him this far from land? I expected everything to be highly colored here, but the Holothurians are black, with coral sand sticking to them.

The lagoon is very quiet, so I am going back to take advantage of the calm and good light for deep sea observations--

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after breakfast on one banana and a biscuit.

Saw the purple-mantle of the (∿∿∿) wave edged mollusk, whose shells are so common along the lagoon shore, and after two unsuccessful attempts, managed to dig one out. What I supposed to be the hole where the neck of a clam protruded was that where the foot of an (oyster?) made an attachment. They apparently attach themselves and grow about as fast as the surrounding coral in which they are embedded.

Drifted across the broken debris inside the reef. Fed the body of the mussel to the fishes, and a beautiful green fellow got it. Am back at the inner shelf where I turned over a large flat coral toadstool, on the under side of which are numerous ascidians and bryozoans; the former are purple, brown, red, and orange, the red being a brilliant scarlet. Also hydroids, sponges, corallines, and green and brown microscopic algae; also bivalves, pectens, and a serpent star are there. This for the ecology of a single lump of coral ten inches by twelve! A single square meter would keep a man busy for several months clarifying.

Drifted into shore, having spent the whole morning in the canoe and on the reef. I noticed that in against the shore there were numerous of the algae-green that we drew last year from Dr. Campbell's pickled specimens. To-morrow they are registering at Stanford, which is about as broad a jump as one should make, even in a journal. But my courses in ecology will be better here than anywhere I could attend instruction, provided I make them worth while. For several hundred yards I could almost continually drag my bare feet along the more elevated bumps in the lagoon.

Wandered back to Hotel along the sugar mill road and trail. Spent afternoon sleeping, reading geology and going down for a swim with the Doctor, who wants to accompany us upon our sea voyages as ship's Doctor and at his own expense. Tonight after dinner we met some people named Kelsey from Los Angelos, and Mrs. B. enjoyed their company considerably. Mr. Yerex, father of Kela the young lady of yesterday, gave me some information regarding the most prominent trees. Very interesting folks who live on the other side of the Island from here. We went for an evening's walk with the crowd and enjoyed it very much.

In the room adjoining are some natives, the help here at Hotel Tiare. My impression of the islander remains the same. They are mere children, playful and merry, giggly and full of fun; the least bit of anything suggestive makes them laugh. In my walks today I thrice traversed the native residences betwixt here and the sugar mill, where one can make all the studies and observations desirable. There are small streams of water running through the places, and platforms are built in them for clothes scrubbing, while this evening several natives, men and children, were seen bathing naked in them. Now I wonder, do they use that same water for culinary purposes. About the sugar mill is a strong smell of alcoholic fermentation, from the refuse dumped into a slowly flowing stream.

Dr. Branto(?) gave me much information regarding natives, and his views are interesting. We both agreed that although they have a little native charm, which is mostly a pleasant facial expression, they are not comparable with Caucasian women. Nor do I think the men our equal in graceful bearing. It certainly is a pleasure to have white folks to converse with, as we had tonight.

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October 1.

La Fantana road. Two white terns flying above tree tops about 1 km. up. Also one blue pigeon, whose flight differs from domestic birds. Myna still present.

Came into Chinese field to watch the terns, but of course they are now where I was before. Saw another blue pigeon. Two more terns. They hover about tree tops, much like swallows.

2 km. A flock of weaver birds, above cocoanut plantation. Third blue pigeon, all seen flying down valley. Also a hawk near protruding warped columnar basalt. Myna and the carmen weaver bird continue up the valley.

Here some natives are clearing a small patch of valley-bed. Here the tree forms come into prominence; vines cling to the trees which are mostly the Hybiscus, and Lantana filling the chaparral brush. Saw some ? with long blue tails and shimmering metallic bronze bodies. There are cliffs even this low, which present formidable aspects, while Le Diadime grows more defiant every nearer approach. Either Myna has a store of new notes, or else I've heard other birds today. But where Myna is, verification is required for all noises. It is quite surprisingly cool and breezy up here, ideal for camping.

Rounding a curve in the valley, from NW. + SE. to N. + S., I came across two new birds; as near as I can make out they are swifts, being about the size, and having the characteristic flight of swifts. They are flying to and fro above the creek bed. They are very dark, almost entirely black, but have a light brown patch above the tail, and light grayish black beneath tail.

In view of, but not at the falls, and a fountain pen lost along the trail. They are a dainty, fairy-like thing, dashing

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In view of, but not at the falls, and a fountain pen lost along the trail. They are a dainty, fairy-like thing, dancing

over basalt formation into the luxuriant vegetation below. Have not time to write at length.

Returned post haste down the trail, for I had but two hours to make dinner. Found my fountain pen, and saw some more swifts, and noted presence of Myna high above inhabitations. Enjoyed some good lung exercise by vociferating loudly in attempted strains. Made good progress, but attracted considerable attention and formed some amusement to natives, with my two walking sticks and a very untropical gait of travel. After dinner walked down to Beck's cottage and back,—a good mile. Nice little place. Ready for falls tomorrow.

October 2

After a very sleepless night, I arose before six and prepared for a day in the mountains. Had breakfast on two fried eggs and a biscuit. Took 4 oranges, 4 bananas, a biscuit, and 3 boiled eggs for lunch. Am one hour up La Fatua road, where I just saw four tame pigeons, and one bird of the ground type, which disappeared into the brush. My only distinct memory is the abruptness of the droop behind, but I did not see her head plainly. It might have been merely the chickens running wild on this island.

Tame chicken, bob-tailed.

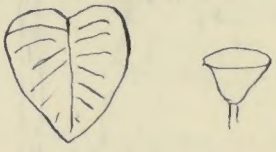
A billy-goat, which I helped catch yesterday, was along the road this morning. He took a notion to follow me and has done so, in spite of my objections with sticks and stones. It was all right except that he appeared to have evident intentions of attacking my rear, which gave me a very unpleasant feeling. A Chinese wagon just passed, and the goat preceded it on the lope.

Swift Cliff (?); saw two white terns here today.

Picked up Billy-goat again, but he has gone back to torment the Chinese who are clearing land just below here, just below little house with tin roof and balcony on three sides nearest road.

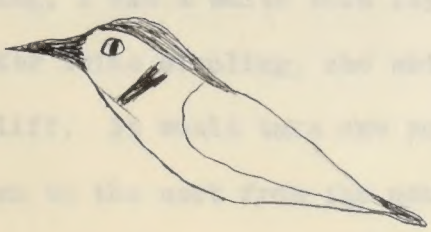
Upper Trail: On east side of valley, just above forks in same. I am up amongst the tree ferns, banyan trees (or least with bowls similar to them.) There is bird life here, for I can hear it, and I saw one black fellow which very likely was the Cuckoo. This region will be very difficult hunting. Myna is apparently still here, but there are other noises.

A most delicious fragrance fills the air, like a newly baked cake when the oven door is opened. There is a large-leaved, large-flowered vine , with a white flower, somewhat resembling a morning-glory, but not so smooth.



Along the stream bank below were wild orange trees. This same canyon in a frosty climate would be a very precipitous walled rocky gorge. But here the rocks are not chipped off by frost, and even on the steepest slopes, lichens and mosses tend to clothe the walk. While only the slightest crevice is sufficient for a good sized vine or shrub, trees grow in the most unbelievable places. There are at least two distinct bird notes overhead, and I must do my best to locate the songsters.

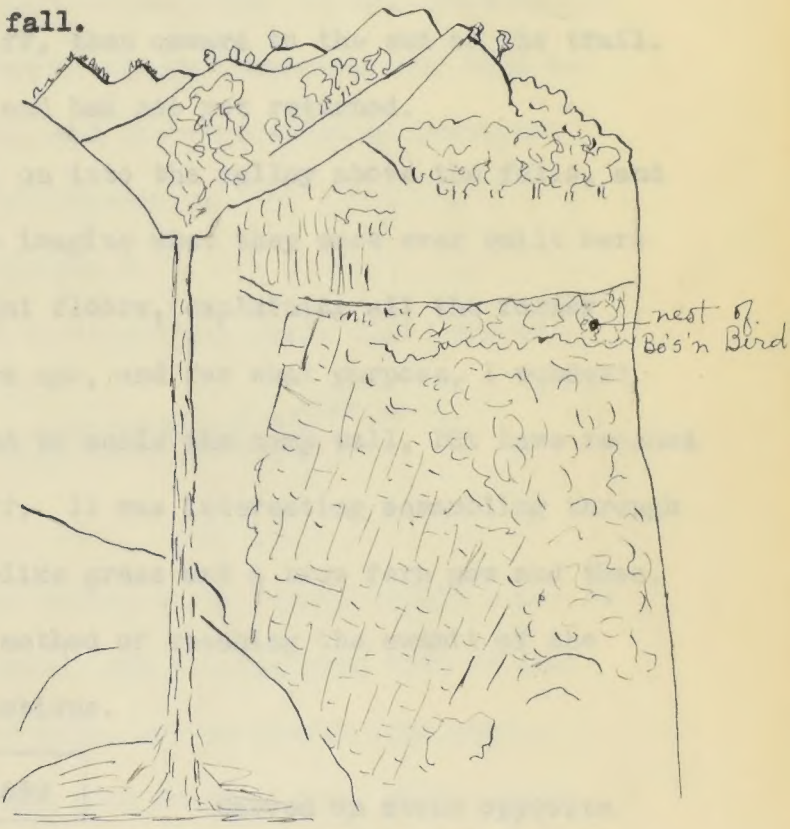
The bird which made the jerky noise like the king fisher looks much like him too, heavy about head and neck, large black bill, gray-blue beneath , black above, with black stripe running around the throat.



Along the trail a number of blow-flies revealed a dead rat, which had evidently been picked into in the region of his liver, but not much eaten. It was apparently the common European rat.

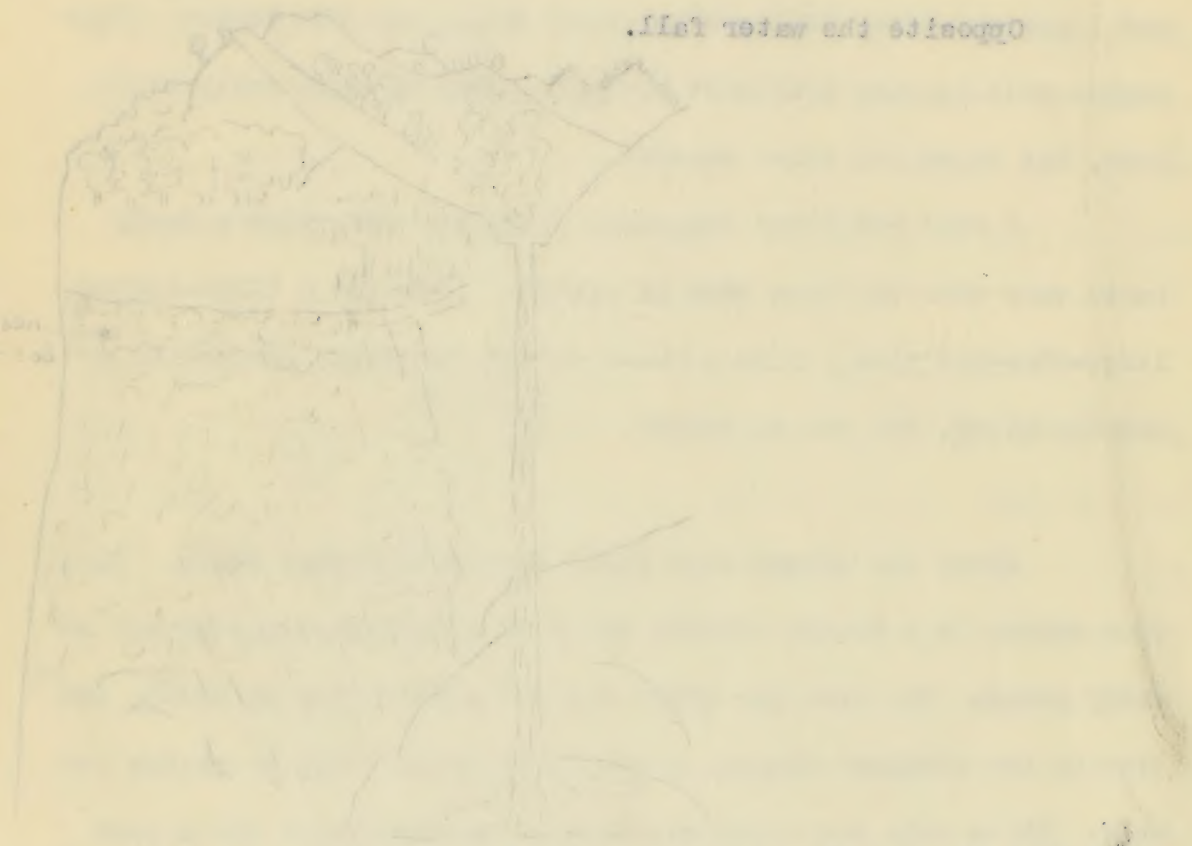
A little farther on, I found a hive of bees in a hole in the stump of a tree. They kept on with their work in spite of my near approach.

Opposite the water fall.



Heard that these falls, opposite which I am lunching, made a leap of seven hundred feet, but a more conservative estimate would put them at less than four hundred. The stream of water is so small that their height is greatly magnified by the contrast. I believe three hundred feet would be nearer than four to the actual leap of the water.

While lunching, I saw a white bird flying around in the valley below, and after twice circling, she entered some brush on the face of a bold cliff. It would take one hundred feet of stout rope to let a man down to the nest from the nearest safe tree. If



it were but fifty feet higher, I should tackle reaching it today. I find that in walking logs above the gorge only twenty or thirty feet my nerve is weak. Yesterday I let my foot slip when it might have resulted seriously. Returning, however, I made my shaking knees carry me back over the log. They'll have to go in worse places, so they might as well get accustomed to danger now. Some pictures of the falls and cliff, then onward to the end of the trail. The bo's'n bird went seaward and has not yet returned.

Followed the trail on into the valley above the falls, and to some old buildings--cannot imagine what they were ever built here for--with iron beams and cement floors, explaining all the former roadway signs. How many years ago, and for what purpose, I wonder?

Thence I endeavored to scale the camp wall, but have reached a limit at the foot of a cliff. It was interesting scrambling through ferns and brush wood, a cane-like grass and a tree fern now and then, and other trees. This is no method of reaching the summit of the mountain. Even ridges look dubious.

Hotel Fantana: AL. 1899

Carved on stone opposite the falls ledge, near masonry work.

DUMENIL
TARAHARE
MARLE
ROGUE

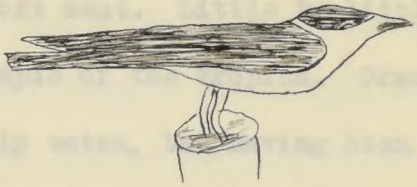
Waterfall view point:-- Saw two more bo's'n birds high against the opposite cliff. Watched one start up the canyon and drop behind the central ridge. There are thousands of places along the walls of this gorge where the birds can nest in perfect safety from man, cats or even rats, I believe. Quite cloudy and may take a notion to rain a little before afternoon is over. Saw a large hawk over summit of central ridge, and another bo's'n up towards

the highest peak to the left of the falls, which is now enveloped in fog. I am loath to leave such scenery with but this cursory glance.

Before reaching bridge, I saw three swifts above the tree tops in the vale below the trail. Although they will be hard to hit and harder to find, we can get them here all right. What an over-abundance of cliffs they have to nest upon or in! Looking out over the tree tops of the ravine is always inspiring, and this ravine is so steep-sided and deep, and the vegetation so luxuriant and dense, that it certainly is interesting.

October 3

One tern on stake in lagoon--black head, light breast, long yellow bill, gray wings.



There was also a blue heron, a rich dark, smooth blue; he alighted on the shore as we landed, and I had a good view of him. He stands about eighteen inches high, not an overly long neck. There was also a small snipe-like bird on the shore, which might have been the sand-piper, or perhaps wandering tatler.

This morning went canoeing in lagoon with Miss Keelah Yerex, New Zealand girl, and had a very enjoyable hour. She thought the corals heavenly, and was quite thrilled with the colored fishes, but did not like being above the deep water any too much.

At the hotel I spent most of the morning sewing leather cases up, and reading even such trash as a "Cosmopolitan". Cannot say I agree with Edison on his theory of life propounded in that magazine, January 1920, although it is much more feasible than most suggestions thus far made, and it certainly affords grounds

for thought.

High overhead: I'm on the ridge SE of Papeete. There are two hawks, large fellows with a band of white feathers above the tail; the rest of body is rather dark brown. They have a very plaintive , whining note, which sounds quite close when they are well above one. How seemingly easy for them to ascend a mountain! Well, that ease is probably one reason their intelligence is not so well developed as man's. It certainly is a blessing to have to work a little for the enjoyments and pleasures we desire.

Visited with Becks, Mr. Yerex, and Mr. Baird for awhile during the afternoon. Manu's wife gave us a cocoanut which held five full glasses of milk, one of which I drank without getting sick; also ate some of the soft meat. Little by little, and I'll be able to live upon this staple of the tropics. Oranges and bananas, of course, are easily eaten, but having been terribly sick as a child on overeating of cocoanuts, I find myself still a trifle touchy to their taste, but I'll learn.

In the evening Holzman came up and I took him down to the lagoon. Along the way he bought a cocoanut and we drank the milk, then halved the shell and had the vender fill the halves with ice-cream. Holzman paid for the canoe, and I paddled him over the inner reef, but he did not want to take the risk of crossing the deeper water to the outer reef. In fact, he became quite dizzy, so he said, looking into the blue abyss, so I let the canoe drift back toward shore. Then he asked if I could sing, and I yodeled a little, then sang some old-time darky songs to suit him. It quite amused the natives on the shore. We paddled about until after six, and he sang " I love a Lassie " fairly well. This is his first day out since landing a week ago. Personally, I am of the opinion that

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In the evening Holman came up and I took him down to the lagoon. Along the way he bought a cocoanut and we drank the milk, then halved the shell and had the vendor fill the halves with ice-cream. Holman paid for the canoe, and I paddled him over the inner reef, but he did not to take the risk of crossing the deeper water to the outer reef. In fact, he became quite dizzy, so he said, looking into the blue abyss, so I let the canoe drift back toward shore. Then he asked if I could sing, and I podaled a little, then sang some old-time darky songs to suit him. It quite amused the natives on the shore. We paddled about until after six, and he sang " I love a lassie " fairly well. This is his first day out since landing a week ago. Personally, I am of the opinion that

he hasn't enough spirit and enthusiasm to ever be a healthy man. Returned to the hotel for dinner. Afterwards talked to Manu about the hills and seasons, and then, after a vain attempt to read, went to sleep in spite of all the Sunday evening noises about. Edison says electric lights increase man's activity; maybe they do.

October 4.

Arose shortly after five and spent an hour getting ready, then struck out via Beck's cottage, where I left the typewriter. Met Mr. Yerex just beyond, and he started me along a road that would lead a short ways up the slope through some Chinese farms. Here I am on a ridge above the farms, and a few hundred feet above the lagoon, which has a very pleasant light green tinge except where deep channels penetrate it. Then there is the white line of the outer reef, and beyond, the blue ocean with its rippled surface, and winding lines of calm surfaces, dim on the horizon where dull blue mists connect with the bank of clouds, whitish above and dark beneath; and then the clear sky flecked with a few fleecy bits of clouds. Distant Moorea has a characteristic mass of clouds hanging upon its ? peaks, and the lagoon there appears narrower than this. It may he the distance which is deceptive, though.

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Darwin said he found the ridges covered with ferns knee deep. That is typical of his conservatism. I found them knee deep to breast high, and just had to pass through a thicket of Lantana and a tall bean-like plant, intertwined by a vine resembling hops. It was very tedious and slow work. A hatchet would have been well worth its weight—all this because I would keep to the right ridge, instead of following up one to the left which has been recently burned. If I go on to the summit it certainly looks like a night on the mountain for a change once more from civilized

beds. The higher I ascend, the more vividly green becomes the coral in the lagoon.

Bees are very plentiful here, evidently finding a brilliant red flower, much resembling Hakea, very well supplied with nectar. I imagine Ave culture is a very neglected opportunity here, as elsewhere,--cowards that we are, to fear the sting of a little insect so much that we will not let him work for our behalf, and I doubt not he enjoys his work amongst the flowers.

Another remark heard yesterday, was that Myna was introduced to eat the wasps. Fools of human beings! Wasps are the salvation of an island like this. Were it not for the wasps, lizards, and a few insectivorous birds, this little pinnacle of rock would be a mass of insects. Found a wasp entangled in a magnificent spider-web, with the spider giving him a very wide berth. Wonder which would be victorious in a battle royal. The wasp escaped from the web. The spider was very artistically decorated green, black, and iridescent colors in a grand mixture of intricate patterns and designs. He was a long, thin-bodied fellow, with a small patch of orange, fringed with white on his back, and long legs held fore and aft.

Stopped to photograph Papeete and Moorea, and gaze at Bo's'un birds. A little farther up I have come upon the skeleton of a hawk. It is too far decayed to identify by feathers.

Length of tibia 11.2 cm.

" " tarsus 8 cm.

" " femur 7 cm.

" " skull and beak 7.8 cm.

Color of wing feathers, black-brown.

While taking these measurements, one about the same size flew down this ridge within thirty feet of me. They are a very black brown, except for the white above the tail.

Many brown birds in the gorge below. A small bird nearby calling, but cannot locate him.

After three quarters of an hour of steady plodding through ferns less than knee deep, along an ancient and often obliterated trail, I have arrived at the welcome shade of a bounteous tree, and the still more welcome lemon tree with its deliciously refreshing, though sour, fruit. Have picked up twenty nice ripe ones, which I shall pile here for home consumption. What is so good as a lemon when a man is tired and sweating and warm? Other fruit he will eat too ravenously, but this he must take slowly, and the cooling effect is marvelous. Now for an egg and some bread à la lemonade. Added thirty more to the pile, and ate three squeezed upon bread and banana. I found Drosophila,-- red-eyed, yellow-bodied -- here in abundance. Can hear a rooster, two of them crowing; does it mean a habitation this high up? Yes! Because as I stood gazing across the head ravine of a valley running westward, there came out of its depths the peculiar words of Tahitian language. The rooster still crows, and the Myna bird helps fill the vale with woodland notes. Tree ferns are here in abundance, and bananas across the vale. The vegetation henceforth promises to be luxuriant.

The trail did not lead as I desired to go,-rather it struck down into the vale. But I decided to try it. Not far down, I met a native lady, ear-rings and one tooth and tousled hair, not much of a dress and bare legged. Across one shoulder was slung the Tahitian carrying pole, and, suspended from it, four large strings of oranges, with at least thirty to the string. A little farther

down, I met a man equally as primitive in appearance, with a pair of trousers,and the pole carrying bananas; also another. At the bottom of the vale, I found a trickle of water, refreshed myself and filled the canteen. Over a bump, and apparently into the banana grove vale, where Myna scolds and chatters. But here, just above the vale, is the remnant of a noon day fire, with orange peels and burnt banana skins lying around. There, in the edge of the fire, are three baked bananas. They had been unable to eat all they cooked. I found them much more palatable up here than they are in the hotel, especially with lemon juice on them. Made out as good a meal as I could wish for, and feel well prepared to go on into the mountains for the afternoon and evening. On to the summit of this little ridge, at least.

Drosophila very abundant--apparently all the same species. A vicious spell of climbing through the banana vale and a lantana stretch above it. The rooster is clucking to his harem, he may yet be a wild one. Myna continues her noises. The banana leaves make suspicious sounds when stirred by the light breeze. It is quite cloudy, so I am likely to find it damp above.

The bananas seem to be well gathered, by some natives, no doubt, desirous of making a few Francs more than a bare living. How contented they should be to live in these glorious mountains! Yet, I would not be so easily satisfied. No, it is not contentment that the human race desires, and certainly not a mere living, either, for self-indulgence on this earth nor promise of paradise to come. What we want is endeavor and thought. That is what makes us feel at our very best--industry of mind and body is our salvation. Why? Need we worry at all about the reason? It does us more good to exert ourselves than it does to grow lazy and inert--that is enough.

After many vain attempts along fruit hunters trails, I failed to find any means of proceeding up the ridge---but how full of oranges I am! Came back and tried another vale, but met lantana at the head of it in mass formation. Retreated and finding trail over into next vale westward, I am now following it out. Stopped to rest a bit in the shade. Will probably spend the night in this neighborhood, unless I succeed in breaking through this afternoon. Wherever the bananas grow, one can travel easily enough, but Lantana and a straggly growth with dentate primate leaves certainly blockade all progress.

That trail was worst of all, for it led me over another ridge and started down a deep cool glen on the SW side of the island. I am very near a good prominence, if not the summit, and certainly should like to reach it. Returning back along that trail, I heard the little weaver birds, and seeing them close by, I stopped and attempted to mimic their peeping. The result was that six of them perched attentively on a branch within one meter of my head. Beautiful little olive green fellows, with their carmen tints!

The cool glen was rich with mosses, liverworts, and ferns, including many tree ferns. Which is the more valuable to me, this method of seeing Nature in her own element or instruction under Dr. Campbell and Burlingham, and then a course in pickled specimens, and hurried lectures? Highly as I value Dr. Campbell's instruction, I believe this will get me further along those lines of thought which I hope to develop before I die. Here in the shade of this luxuriant vegetation, calling birds around me, and listening to their calls, and the hum of insects--this will, I believe, be an invaluable experience for me. If it all be like today, Yes!

I returned to the little creek, and, seeing tracks up its bed, suspicioned the trail of leading up there. Followed to its source beneath a large rock which forms the saddle between the two peaks there, but no trail could I find leading on toward the summit. So I decided to return to Papeete for the night. At the top of the ridge, after taking the back trail out of the ravine, I stopped to photograph and eat all the lunch I could. Discovered my pocket knife missing, so returned down to creek where I had last eaten an orange, but it was not there. Well, I need a machette, not a pocket-knife. Back and ate up eggs and banana and orange, and left what bread I could not eat on the bushes. Filled my bag with the lemons a little beyond, and struck down the trail in a vain attempt to reach the Chinamen's wagon road before dark. Made my usual blunder by following the most pronounced trail,instead of the one I had planned taking to avoid the briars, ploughed through between the Chinaman's and the low ferns. It led me far off to the West, but I thought sure it would get me safely down to a road. It quit me badly, just where the briars ended, with a canyon to cross and a ridge to pass over before reaching the one which would lead most directly to Papeete. Had a very interesting time breaking through the brush, but got down off one ridge and picked up trail leading into next; but the lead I followed there ran me down that ridge to a cocoanut grove where all trails ended.

I returned up the ridge to where a light burned, and had a naked Chinese, with a big formidable machette in his hands, put me on the road to Papeete. Felt good to pass his buggy and feel a good broad road-way beneath my feet. Found sticks very convenient for feeling way along in the dark, and they prevented many a stumble. Dogs along the route thought me suspicious, and I was

obliged to rap one smartly. Natives, no doubt thought me crazy. Avoided the theatre and came to hotel via Mormon Church Walker road. Becks were here, and were quite pleased to see me show up. More red-tape to-morrow before we can get our permits. So I guess, I'll not watch for Bo's'n nests in the deep gorge. A good shower. Two dishes of sugar and a glass of lemonade while I write this up to date. Certainly was one glorious day of about fourteen hours of hiking, including many rests.

October 5.

I am down at the American Consul's to meet Mr. Beck for further red tape over permits. Everyone was worrying about my absence for two hours. From one office to another, and then back to the first, and by paying 33 Francs each, we secured our permits, both to carry the shot guns, and to shoot them. At the custom house, however, the letter from the governor said baggage, and that apparently didn't satisfy the customs officer. So it was two o'clock nearly before we finally succeeded in getting the shells and other freight. After carting it to Beck's cottage, we started to unpack it. The Becks having a social call to make, I opened the various boxes. What a mass of ammunition for two men to shoot away! Spent an hour rigging up for to-morrow's hunt. I carry a 12 gauge.

October 6.

Heavy shower this morning, so I did not exert myself, but the weather cleared, and so we struck out, intending to go along the shore. Turned into mountains, and tried the ridge left of Topierni, by ascending through the brush. After the storm the heat was terribly oppressive, and especially did we notice it with our strenuous labors up that steep brush-entangled slope. We scratched our hands very greatly, and completely took the pep out of us. Lantana has

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sway all over the foot-hills, a very pretty flower still sold in New Zealand by nurserymen.

We até the beans part way up, and then decided to call it half a day at least, and so returned down a trail leading along the next ridge, coming out between Police Buildings. Went over to a shop and ate two dishes of ice cream and drank two glasses of ice water,all very slowly. I came to hotel and idled away remainder of the day, mostly by sleeping.

October 7.

Was up at daylight today. Came out road to Bridge, where I caught up to Mr' Beck. He is going along shore. A Gendarme there came up and demanded our passports, permits, I meant. Came up mission valley, where I came across a man working in a cocoanut grove. He had some Mangoes piled up, and offered me some. I ate one, and pocketed one. We talked at length in broken English. How I miss French! He promised to leave me a green cocoanut beside the road against my return. Called and shot a weaver bird, but since then have missed Myna twice; the wary old fellow is going to be hard to get with auxiliary cartridges. Am up among the cliffs around which the Bo's'n birds were soaring Monday. Have heard some Kingfishers, but as yet have had no opportunity to even see them. The worst thing about this task is the finding of the birds after they drop into the brush, which is quite thick everywhere.

Just about where the gorges divide, I was calling under some well spread boughs, when a Kingfisher answered, soon after coming within range. Obtained two specimens of them at this place. A little farther up, I again missed a Myna; he is apparently a tough fellow to kill. While sitting here writing, a caterpillar dropped on the rock beside me, and squashed. A very beautifully

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colored fellow, smooth skinned, with minute designs in red, orange and green.

Obtained two more Kingfishers, and one Myna, returning about three o'clock to Beck's cottage, where I found him busy finishing the preparing of the skins for the five birds he obtained. Mrs. Beck skinned one Myna. I spent the rest of the afternoon skinning and preparing my Myna, Mr. Beck fixing all the kingfishers and the weaver bird in the same length of time. Our total catch today amounted to one blue heron, one black-headed tern, one wandering tattler, three mynahs, four kingfishers, and one weaver bird. Mr. Beck certainly is an expert at skinning. I was not only slow, but clumsy and awkward with this first attempt. But I hope to get in practive soon on Mynahs.

October 8.

Was quite lazy this morning, with the result that I did not get an early start hunting. My marksmanship today was worse than my judgment, and it was very poor indeed. Once I shot at Mynah, and other Mynahs, a pigeon and a tern hovered around to investigate, but I failed to bag the tern, and after that excitement, lost track of the Mynah which had apparently been wounded. Another time I took a long shot at two with 11 shot; got one, and winged the other. Spent half an hour trying to catch the cripple in the brush. I planned on using him for a decoy, but the result was that he escaped.

Later got two long shots at Bo's'n birds and missed. Also continued to miss Myna, and again missed two terns who insulted me by hovering directly overhead, too close to shoot with large shells, and not long enough for me to reload.

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October 9

This hunting and skinning is not going to be as conducive to journalistic endeavors as was the straight observing.

Went out this morning to the foot of the canal which runs in front of this Hotel Tiare. There picked off two wandering tatlers, and two Mynahs, and about s'teen native kids. But they obliged well at keeping behind out of gunshot. Went on down beach to slough of water, which was a little difficult to cross, so returned with three Mynahs. Took a shot at the tern which was perched upon the stake by canoe landing, as one was last Saturday and Sunday. Knocked him off his perch, but did not kill him; paddled out in canoe to where he hit, but he was able to rise and escaped another charge of shot. Returned and missed a blue heron at entrance to canal. The trouble was poor marksmanship, and too fine shot. Returned to hotel for noon breakfast. Spent afternoon preparing three Mynahs and one tatler. Mr. Beck fixed the other in just a few minutes. My time was not one bird an hour, which is quite slow, but I am picking up the methods fairly well, and seem to make acceptable skins.

This evening Mr. Beck and I printed a few pictures, which turned out very well. One of myself and a native girl is good because it is impossible to tell which is the darker skinned of us two. Others that were good were of Copra, grass huts, native children and scenery. Brought the Corona home, and hope to get started to-morrow on a circular letter.

October 10

Spent the entire day writing a circular letter about Papeete, and most of the evening.

October 11

We are now prepared for our Inland Journey. I stayed

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October 11

We are now prepared for our Inland Journey. I stayed

up late last night and fixed up a very small, compact, and at the same time complete, medical kit, which will, I think, hold us safely through two weeks, and is sufficient for at least one broken leg or wound.

Had Manu write down two pages of native sentences for use with our guide, and other natives we might meet with. There is a good deal to the language, but it is a little difficult to understand the construction.

It is with the same amount of enthusiasm and anticipation that I prepare for this excursion, as it has always been in getting ready for any journey into the mountain fastnesses. And such mountains as these, with their steep slopes, high unclimbed peaks, and deep gorges, thoroughly clothed with tropical underbrush and a vegetation unusual and very interesting! Of course, the animal life is very scarce, and birds not very plentiful, but,for all that, it is wild and untrammeled by mankind.

Half an hour up the valley at the second ford, where the Becks have stopped to change to their wading shoes. We found our two natives waiting for us at the bridge, one an elderly sinewy fellow, the other a sturdy young man. They tied our heavy baggage to the ends of two short stout poles and would have carried everything we brought, but Beck and I have fair sized packs and guns and ammunition. At about nine-thirty we struck out in the sweltering heat.

We will probably camp early today, especially if we get in the vicinity of any birds. This valley Pomeroo is apparently very brushy.

Mr. Beck killed a little green dove, and I obtained three young wandering tatlers. We stopped for lunch where the trail

crosses a small stream coming from the south. In it are numerous prawns, of which we will later taste. The trail went straight up a very steep ridge that made us, with our light packs, rest often. Here come our two natives, with their heavy loads, and I believe they are less winded than we. They are in their bare feet, while we are wearing hob-nailed shoes. They have stript to their waists, and now I see what Darwin so greatly admired, for, indeed, their bodies are handsomely muscled.

Just got a kingfisher. Bo's'n birds in canyon opposite.

BOOK III.

Tahiti

Journey into the interior, via the valley of Punaruu.

October 11-22, 1920.

October 11.

At an elevation of 1700 feet, we arrived at a small grown-in lake bed, where were several plover. Our coöperation at the shooting was poor, but Mr. Beck killed his first, both of us missing our second wing shot. We came on a little farther and pitched camp,—a bamboo pole, with the two canvasses stretching out, and a clear space beneath, with a fire close in. Everyone had a change to dry clothes, after the heavy rain, and so we feel jolly and cheerful now.

For dinner tonight we had all the rice we could eat, three small slices of bacon, bread and coffee, and a gravy made from the rice water and bacon.

Our two packmen--better than any mules--soon appeared along the trail in their trousers only. Then they showed up to advantage, the muscles of their back and chest standing out in sinewy strings. At the first opportunity I tried the weight of the older man's load, and it was all I could lift off the ground--fully 200 pounds,-and he had carried it up that winding trail and steep slope, when I was winded by the light pack. Let no man ever claim

BOOK III.

Part II

Journey into the interior, via the valley of Pumarun.

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man's load, and it was all I could lift off the ground--fully
300 pounds--and he had carried it up that winding trail and steep
slope, when I was winded by the light pack. Let no man ever claim

to be a mountaineer until he has hiked into this island, and has had a native Tahitian carry more than a man's weight along the same trail.

Just before sunset, we had a good clear view of the peaks surrounding us. Here is scenery very seldom seen except by a few favored individuals such as we are. Except by a few, these hills and gorges and this vegetation goes unappreciated.

October 12.

After midnight I was none too comfortable, and so rolled around in vain efforts to keep warm. Must have slept some, because when I supposed it merely three o'clock it was four-thirty. A fire felt good, and the energy required in its building, much better. The day is slowly dawning beyond the formidable peaks to the eastward. Mynah and the kingfisher are calling us to work, mostly mynah.

All during the night, or at various times during it, we heard landslides along the neighboring cliffs. Just across the canyon is a bit of rock rising abruptly out of a ridge 200 feet, or more, straight upwards. And over the peak,due east of us, appears what I surmise to be the tip of L'Diadime, at least, it is abrupt enough. The fire has just reached a splendid cooking stage, and the camp is stirring, so I am off for some buckets of water.

Yesterday I skinnied up a cocoanut tree and provided the crowd with meat and drink. One of our guides and I are now at the same tree, and I started up it, but in a dry condition I slipt back. Then he stript some bark off a sapling Hybiscus nearby, and, making a loop, he fastened his two feet together just so they would fit on the sides of the tree; then up it he went like a monkey.

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He brought down five nice cocoanuts, one for us now, and four for camp.

He and I went out this morning and had good luck in bagging a swallow and three doves, which latter he called by a clever mimicking of their cooing. Returning to camp for lunch, we took in two dozen oranges and some lemons. Lunched on Van Camp's Pork and Beans, the bodies of yesterday's bag, hard-tack and jelly. We are out for the afternoon, and just called and captured another of the beautiful little green doves. We tried calling doves for three hours, then returned to camp via " Plover Puddle ", where I again missed four shots at three plover.

We hunted today about this inland plateau, to which we ascended from the river bed Monday. The Aneroid registers 1650 feet elevation, which appears to be about correct from the relation of the surrounding peaks. As nearly as we can make out, the L'Diadime is that bold pinnacle of rock I mentioned yesterday, but we are seeing it from one end here, and so I am not certain until we get directly behind it. With Fantana over the ridge to the northward, it is possible that our guide is right.

After two days of mountaineering with these Tahitians, I am thoroughly convinced that they are wonderful specimens of woodsmen. As for their strength, that is vouched for by the loads they carry. Those feet which I so little admired--and which had nothing admirable about them--in the village, are here revealed as the hiking foot par excellence. Barefooted and barelegged, they will go over the roughest of rough lava rocks and through Lantana at its very worst without a scratch. Nor do their boots cost them s'teen dollars a pair. They have another attribute of perfection when applied to hunting. My companion, when stalking a bird, is more

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quiet than Leatherstockings himself, or any American Indian in his moccasins. Where there are dead leaves and dry twigs in super-abundance, it requires more than caution to steal quietly along; it necessitates perfect muscular control of the entire body. That, I believe, these Tahitians have.

The older native, who had carried the big load, we let rest in camp all day, and in the afternoon I set him to watching a pot of beans. So for dinner, we had our old Yankee reliable, even to the pork in a slightly increased ratio to Van Camp's mite. Add to that a can of New Zealand corned-beef, which includes considerable fat, hard-tack, and jelly, and tea for those who prefer it, but co-coanut juice for mine, and you have a meal which is too good for any king--the same creatures not only being out of style, but not being good enough to indulge in such delicacies at just this spot and in just our conditions.

Mr. Beck is very kindly doing most of the skin preparing, and allowing me to hunt all day, which is just what I prefer to do.

We saw signs of wild horses and pigs, and heard goats all day and night. My guide is very clever at explaining by that universal language of signs and imitations. How far digressed are our written languages from the original tongue of mankind, where the sound represented the object as nearly as possible! A good imitator of barnyard and woodland voices can talk to people about animals,no matter where nor how they live.

I was afraid this journal of reflections and occurances was likely to suffer from our program of daylight until dark for the Academy. But, as in all other things, the Lord will provide (if we make the best of the provisions at hand). This time it is in the form of a cool wave, which comes upon us about three

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o'clock of a morning. Darkness sends us to bed at seven, when, being tired and sleepy, it is best that we should retire. The coolness makes us awake if we oversleep our allotted one-third of time, and gives one-sixth to the arts--if these lines might so be called.

October 13.

Mr. Beck began to stir at daylight, so I stopped writing letters, and went after the breakfast, which was excellent, being composed of the bodies of three doves, well stewed in the water drained from the beans we had last night; also the fatty portion of a can of New Zealand corned-beef, while the remainder of the beans and rice made a thick " goulash ". There was coffee for those that preferred it, and cocoanut juice for mine; hard-tack and jam.

We struck camp this morning, planning to move first thing, but the guides came up the trail with some very emphatic signals that over near the cliffs south of us there was something we should hunt. They also cut into tree and smelled leaves, saying " mite"--good. So Mr. Beck went out that direction with the older guide, while I cleaned up camp and went back to " Plover Puddle " and north of it, where I had Teihu call pigeons all morning; but I only succeeded in bagging one. We returned to camp at eleven per agreement, but the rest have not yet turned up. We do not know whether to continue packing or not. We may not move now, with a late start.

Have been bothered just a little today with prickly-heat, which is due, no doubt, to excess of proteins. Made undershirt the uniform of the day with my young companion, but the older guide went us one better, and bared to his waist.

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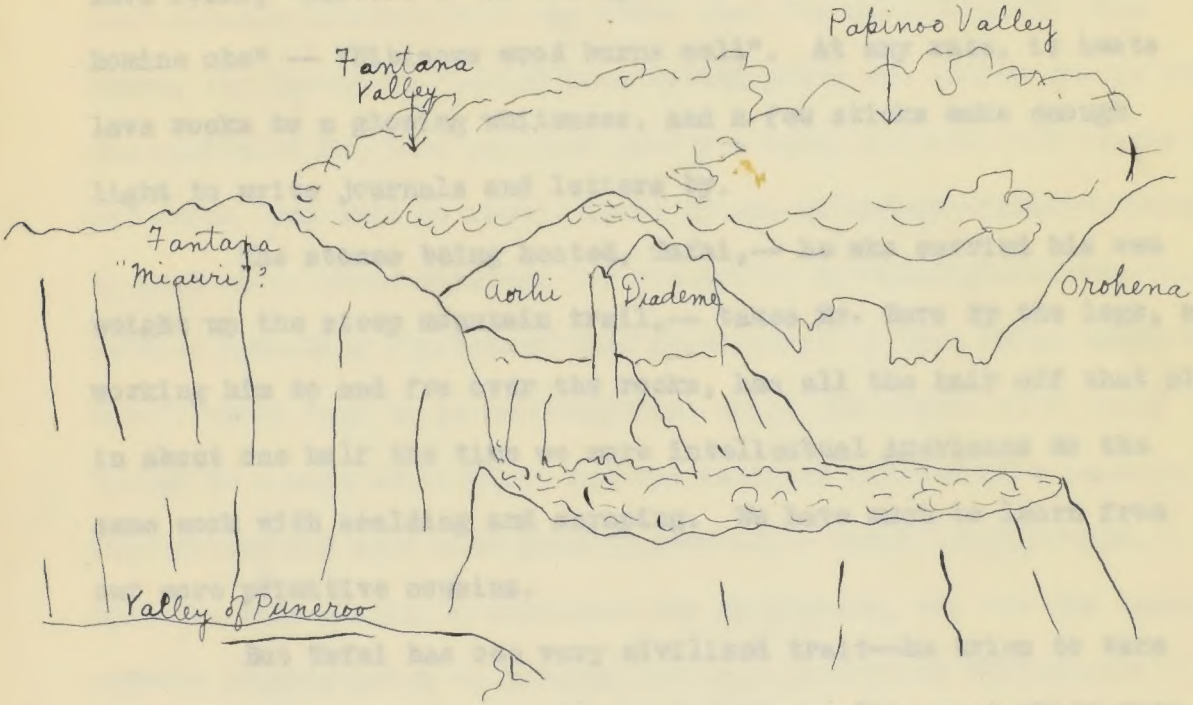

ROAST PIG.

Who has not enjoyed at one time or another an extraordinarily palatable dish of one particular kind of meat? It was our good fortune last evening to so enjoy roast pig.

Mr. and Mrs. Beck were seated beneath an orange tree, appreciating the bounteousness of Tropical Nature, while their guide was up the tree gathering fruit. While so occupied, or rather not occupied, up towards them came, in an unconcerned, nonchalant manner, an animal known popularly as a pig, and called by the Tahitian natives " Puaa maohi ". A load of birdshot squarely in the forehead put an end to Mr. Puaa's contented life of luxuriant ease and

finished lunch after twelve-thirty, when we heard a shot nearby. That told us the roast were arriving soon. Soon they came, they were all smiles, and Mrs. Beck announced that they had killed, besides four doves and some Kingfishers, what was more to the filling of our larder---a pig.

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tropical independence.

Down from the orange tree scrambled Tafai, the guide. In the traditional time allotted by fiction, but in this case a fact, in less time than it takes to tell it, he had a pile of "Bahia Laite" kindled and burning, and, most important of all, buried with lava rocks, "Ohivete". Of the Hybiscus wood they say "Bahia Laite homine ohe" -- "Hibiscus wood burns well". At any rate, it heats lava rocks to a glowing whiteness, and a few sticks make enough light to write journals and letters by.

The stones being heated, Tafai,-- he who carried his own weight up the steep mountain trail,-- takes Mr. Buro by the legs, and, working him to and fro over the rocks, has all the hair off that pig in about one half the time we more intellectual Americans do the same work with scalding and scraping. We have much to learn from our more primitive cousins.

But Tafai has one very civilized trait--he tries to take short-cuts homeward to save time and energy. Like most short-cuts, the one this day resulted in leading through dense tangles of brush only to be found in the tropics. But Tafai does not fear a little work, and so, with his machette "Teete", set to work to hack out his mistake rather than return by the known trail. Mr. Beck brought, rather than carried,Mr. Buro--which accounted for a few bruises along the ribs and back. But why be careful or particular when pork runs around seeking destruction?

At camp a second fire was built with "Bahia Leite and Ote", piled in layers opposing each other in successive tiers, until about a foot and a half deep; then buried with the ever plentiful "Ohevite". One recedes to sit on a turn-spit when trying to write by the light of a camp fire; it would roast all sides equally. At first their

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fire smoked heavily, but later it appeared to be blazing. When they returned from the spring where Mr. Buro had been taken for dressing--which helped his nudity not at all--the rocks being heated to a glowing whiteness, all the upper ones were removed. Then green saplings and branches of "Leite", about an inch through were cut and laid closely together over the rocks that had underlain the fire. On these, the leaves of "Leite" were spread about two inches thick; then the quartered Mr. Buro was laid upon his bier, covered with leaves and hot rocks, and left to rest. There is the method of cremation formerly used about these islands, for the art of so cooking meat was developed upon Long Pig rather than short pork. I have often wondered how it would feel to be held captive, while the stones were being heated to a nice white glow, and the tattooed savages of a cannibal isle danced and sang your funeral services. Tafai laughed when, while we were dining, I mentioned the Marquesans, who are the typical members in this group of islands, of that society of "Epicureans Homo".

At dinner this evening we dined as only man in his primitive stage, or in a primitive method, can dine. Tafai and Teihu, after three hours of cooking, opened their improvised oven and drew forth therefrom the juiciest looking pieces of pork I ever beheld. With their machettes they scraped the meat from the bones,--I saved out a side of spare ribs, and Tafai set aside half of the loin--and into two sections of bamboo, about three inches in diameter and two feet long, they packed all but the bones, upon which they commenced to dine. We had them wash some rice and boil it for a side dish, but I joined them on the bone-pile, and picked bones savagely until almost dark.

Having dined to our literal fill, and rather to our dis-

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comfort than content, our culinary artists prepared the third fire of "Bahia Leite", buried in rocks. When the coals glowed and the rocks were well heated, they again cut green saplings and gathered leaves, and before they bade us good-night, the bamboo cartons were left to steam in the oven, where at this writing they still are.

There is one thing that should not be overlooked in this narrative. When they returned from the spring with the pig, one of them brought along two poles of water, the same being a bamboo of four sections length, with the joints knocked open, and the upper end corked with a wad of leaves. This is suspended slightly for'ard of the balance by a strip of bark from a sapling "Leite", so that it makes a very handy water bucket. For washing purposes, the best method is to sit astride the upper end of the pole and bear down slowly until the water flows into the cupped hands, whence it can easily be applied to the face.

There is your Tahitian native, so well capable of applying the provisions within his reach to the exigencies of the occasion. Witness thereof is our delicious roast pork.

October 14.

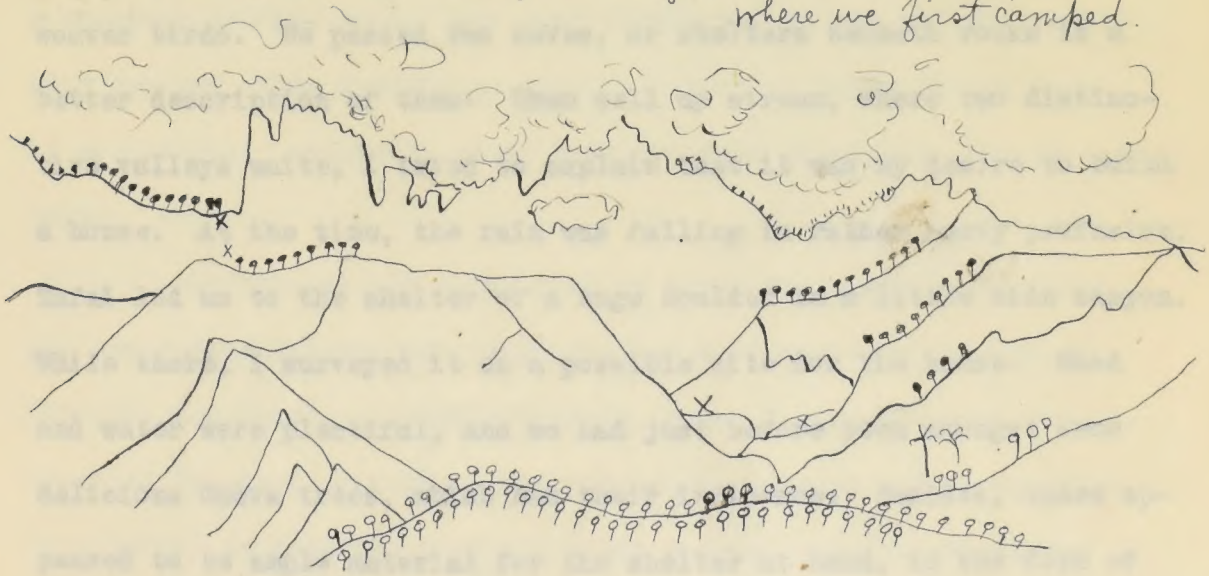
Last evening, as it appeared a bit stormy, we again erected our sham tent, and got everything in ship-shape. At one this morning, after five hours of good sleep, the rain commencing to fall awoke us. We made everything secure, and returned to our blankets. At two o'clock we were startled by considerable racket near our tent. I suggested rat when I saw one on a low branch just over my head, but we decided it was a much heavier animal and must, therefore, have been a pig, since there are no native animals, and only horses, goats, pigs, cats, rats and mice running wild from introduced stock.

Being so widely awake then that I knew it would be futile to try to sleep more, I arose. Have almost used up all our wood, with one hour still before daylight. Several small sprinkles have passed over us since I arose.

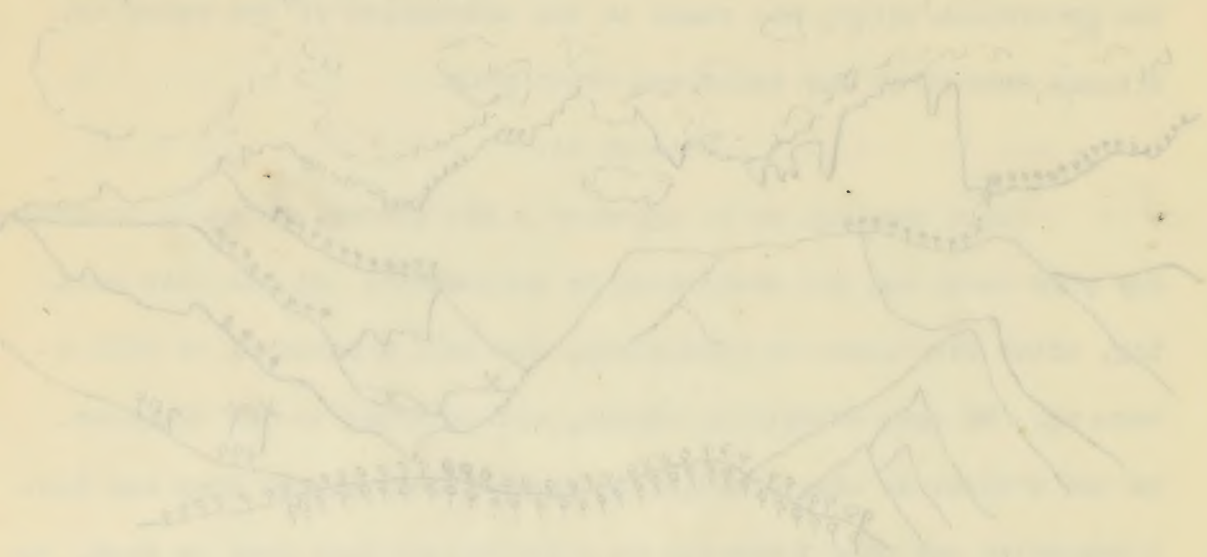
Have just heard the shearwaters on the distant mountain. To-day we move camp, and, since there are no birds to skin, it will be an early start, rain or not.

Rain prevented our moving camp this morning. The pig "Puaa", as I to-day discovered his name is spelled in Tahitian, not only fed us well, but caused us a serious delay. I at first suggested hunting along the trail ahead of the camp-moving party, but later decided upon going over with the guides and building a house for us to move into when the opportunity arrived.

The trail leads off this plateau at a point from which a splendid view of the mountains is to be had. I shall endeavor to sketch it if possible. Looking up valley of Puneroo from the plateau where we first camped.

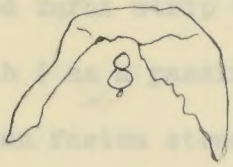


Then we descend into vale after vale coming down from the mountainous wall north "Roro" of us, to a few scattering cocoanuts. There it swings downward, dividing. We took the upper, leading along the south side of the River Puneroo, except when fording or following the



bed of that stream.

Where we first struck it, we found Opea, the swallow, nesting. Obtained one, but decided to leave the eggs and nests for photographing. They were mud nests, built in the shelter of an overhanging rock, smaller in proportion than in the sketch.



"Opea" - Swallow-nest.

We had bagged one "Upa", the green dove, at the vicinity of the cocoanuts. At the river Tafai discovered a ripe cocoanut, which had lodged in the rocks. We shared it, and it tasted splendid.

In going up the river bed and fording the stream several times, we had a vast succession of interesting experiences. Tafai, with his hands and machette, captured an eel in shallow water; later I shot at one, and missed it. We found sugar-cane in abundance, and went along chewing it. Then we obtained a few kingfishers, and two weaver birds. We passed two caves, or shelters beneath rocks is a better description of them. When well up stream, where two distinctive valleys unite, I tried to explain that it was my desire to build a house. At the time, the rain was falling in rather heavy profusion. Tafai led us to the shelter of a huge boulder in a little side canyon. While there, I surveyed it as a possible site for the house. Wood and water were plentiful, and we had just before been amongst some delicious Guava trees, which had their influence. Besides, there appeared to be ample material for the shelter at hand, in the form of tall straight suckers of Leite and a cane-like, tall wavy liliaceous plant with broad leaves, which Tafai said were suitable for roofing material. It was cold standing there in our thoroughly saturated clothing. The "dia" was now descending in real tropical style, so

at my suggestion, we set to with a vengeance and cut all the nearby saplings and suckers about two inches through. Then Tafai erected uprights and ridge pole, at first planning a lean-to against the rock, but as a little water trickled down on the under side of that, we at last decided upon a complete house. It was very interesting to watch the experienced Tafai strip the bark from green saplings with his few remaining teeth (as a passing notice, these Tahitians have very poor teeth) and then fasten steading, joist, rafter and sheeting in place. Teihu appeared with the broad-leafed fern, "Oaha", which is bent from sheeting pole, and lapped over from bottom to top. In the meantime, I turned to on the growth of thatch-lily, and piled up huge stacks of it. This went above the fern. Then we leveled off the dirt floor, with considerable pains and pointed sticks digging out an obstructive boulder, and in four hours our shelter was complete, the rock requiring two hours.

Beside it runs a brook,and a little below,it plunges into a splendid bathing pool. Our task completed, we set out on the return journey after washing my shirt. I left it there to dry when it so desired, returning in my bare arms and undershirt and shooting vest.

Arriving at the first fork of the river where we had left our sugar-cane and the eel, high and dry, we found them beneath the flood of the storm. A raging torrent, waist deep, was quite in contrast to the small stream we had previously crossed. With the aid of a stick, we made the ford all right enough, but I wondered how we were going to prosper at the many places where crossing had previously been none too easy. But Tafai knew another trail which led along a bit of shelving table-land, north "Nia" of the River. We found it a very interesting trail, through ferns, various kinds of high trees,

dense growths of vines, and at one place a thick grove of bamboo. Bagged a pair of kingfishers at one shot.

This morning while I was otherwise employed, I handed the shotgun to Teihu, but he didn't get an opportunity to use it on a bird. While we were building the house, he came to me with the gun and asked what I did with the safety catch. I motioned for'ard, and he unsafed it, and proceeded to kill "Rura", the kingfisher.

Along the trail we came upon the merest sign of a vine which grows from an edible rootstock, but some other intelligent native had dug out the root. We also saw to-day "Taro", and as there are Yams and Feis in the near neighborhood, our fare will be à la Tahiti at the new camp. Also at the river Paparas were found, one of which and a pineapple I carried back to camp. We had to-day, cocoanut ripe and green, sugar-cane, oranges, pineapple, and guava. As we chewed sugar-cane most of the time, we never noticed at all that we were hungry.

Arriving at the river again, we stopped to eat oranges, and then, with a pole apiece, we started to wade across. On an island Tafai found another eel, and I deliberately shot at him from close range, splashing water all over us. But I wounded "Pui", the eel. Here the stream was waist deep again, broader and swifter, but we made the ford safely enough. Soon thereafter ascended to the cocoanut bench, and then following the trail up hills and down dales aplenty, soon arrived at camp; having been absent more than ten hours. The effort kept our blood up, and was certainly better than sitting around in camp trying to keep dry. A change of clothes, and a goodly share of the beans well cooked with bacon; another feast upon "Pua" which comes out of the bamboo sausage skins, or better, meat-cans, in a very delectable condition. We have a very little dry space be-

dense growths of vines, and at one place a thick grove of bamboo.

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neath our shelter, and so plan on keeping a fire all the night, the men heaping our woodpile bounteously high. To bed at seven, and awake at ten-thirty. Fired up and wrote until midnight.

October 15.

Showers continued through the night, but this morning it cleared away sufficiently for us to pack up and move to the new camp and our improvised house. Tafai went on ahead with Mr. and Mrs. Beck. He carried them across the river at the two fords. I remained behind with Teihu and enjoyed the rare privilege of studying the play of his back muscles while he carried fully 120 pounds up some very steep trails. Now I can see what Darwin saw in the Tahitians,and my respect for them is raised to such a high degree that I fear my judgment of men in the world, physically, will be based upon these two mountaineers. They have developed on their shoulders, just above their collar bone, a callous that requires no lion-skin pad used by the mythological Hercules. As one shoulder tires, the pole is swung round the back of the neck to the other. Rests they very seldom take, and apparently as seldom need. I was sorry that Teihu wore trousers, for they prevented my observing the muscular control of his legs, which must be even more marvelous than that of the arm and back muscles.

The Tahitian has a most wonderful foot. I am reconciled completely with the women folks of this island, for their not possessing ankles and Grecian gracefulness. Their large heavy calves and ankles, and their broad,sturdy, tough feet have been the natural result of the life on this island. Being the mothers of such stalwart men is glory enough for any woman, and beauty she need never possess.

Teihu's feet put us civilized people to shame. There are toes which are not useless appendages of pedal flatboats like ours. He uses the balls of his feet for walking purposes uphill and es-

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pecially downhill. When he steps upon a solid stone in the trail, his toes clinch upon it firmly, and the same is true with roots. This is the art of climbing the cocoanut tree, the toes and ball of the foot do the work. I saw him pull a branch of an orange tree down within reach, and, holding the hooked stick which held the branch between his big toe and the one next, he had both hands free to pick fruit. Their ankles may not be beautiful, but most certainly they are useful. The movements of their feet side-wise and up and down are extraordinarily great, which is useful in mountaineering. Their slowness of action is more deliberate control than laziness. All in all, I give them the laurels for climbing and carrying loads.

At the river Teihu and I went swimming, but he did not take off his trousers. I swam a bit above water, but the rocks bothered me. Later he revealed to me how to swim beneath the surface. The speed with which they glide along is astonishing. He promised to go pearl-oyster hunting with me someday. We stopped across the river from camp, and indulged in the delicious drink of cocoanut juice. I carried one into camp. Although the natives seem particularly fond of this drink when hot and thirsty, they do not care for it with their meals. I find it is a bit sweet and tasteless, but better than tea or coffee. We made camp shortly after noon, lunched, and went out along the trail above rock to cliff base, where we sought shelter beneath a large tree through a very heavy shower of rain. It is raining now, but I find it quite comfortable and very interesting, even with rain. Some people, however, are quite uncomfortable in the showers. The only objection I have to it is that the wood is all so wet that a bright fire is almost impossible. Cooking and heating are possible, but writing is very unsatisfactory

and hard on the eyes.

Although we have had quite sufficient rain this trip, still I thoroughly appreciate a good heavy shower, even when out in it without a rain coat. Here especially, where it is quite warm enough to withstand the storm naked, I have adopted the native style of going shirtless, but still retain my BVD's, and then the hunting vest protects my body some. Lantana and the lemons' thorns make rather severe inroads upon my tender white skin, but in time it will become as brown, if not quite as tough, as the Tahitians'. What a perfect example of ages and ages of natural selection is the color of people! Where the sun has tanned them and blackened them in the tropics, they certainly make one realize that we are the victims of our circumstances, the creatures of our environment, guided slightly by hereditary principles; for where the sun-tanned have migrated to temperate and frigid zones, they have become bleached white, or the sickly yellow of the Chinese and Eskimo.

Our house leaked a little during the heavy showers of the night, but one piece of the canvas afforded sufficient means of turning the drippings away from enough space to sleep upon. I certainly wish it had been daylight during one shower which sounded like the heaviest I was ever in. There was a little lightning and thunder with it in the distance. The worst of all was that darkness till daylight meant ten hours abed. Hence this journal has suffered.

October 16.

The process of cooking eels (Pui), which Tafai caught this evening, is very similar to that used for Pua, the pig. A fire is built of sticks heaped in layers, crosswise, and surrounded and covered with rocks from the size of a man's head to that of his fist. The eel is dragged across the hot rocks, and then the slime is

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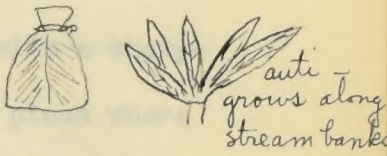
rubbed off with leaves. Having cleaned him, and cut him into cross-sections somewhat thicker than an amateur botanist makes for slides, these are wrapped in green leaves of Oaha. (The broad fern leaves of Oaha and of Auti and Opui were gathered, the first being heated above the blazing few sticks placed above the heating rocks, and the bundles appearing like half of a tamale. All the wood is removed from the fire, where the hot rocks are spread evenly.) Upon this the bundles of eel are placed and surrounded by Feis. Leaves of Oaha are then spread above them, thickly and closely together, in layers crosswise. Leaves of Auti follow, and lastly Opui, with large rocks placed around their edges to hold them tightly and securely. Smaller rocks on top, and then left to cook--is it baking or roasting, or broiling barbecuing?



This morning I cooked the left-over Feis--a wild banana which cooks about like a potato bakes when dropped into the coals of an open fire--in the frying pan, where bacon had been fried. After searing them well in the hot grease, water was poured on, and they made a gravy which helped appease a particular palate. Last night we had them roasted à la Tahiti, but without any sauce they were rather difficult to eat, being extremely dry. With salt and plenty of butter, I imagine they would be all right, but butter is none too plentiful, and with the remains of Pua, heated in his bamboo casing, and the juice in the bottom thereof, they were passably fair. Tafai left camp soon after his arrival here this morning, and about three o'clock came in with a pole and two bundles of Feis, yesterday.

This morning after breakfast, Tafai, Teihu and I went up the trail above camp. It led through several orange tree and lemon

tree groves. Passed a house built of cocoanut palm leaves woven and thatched, beneath which the floor was thoroughly dry, after all these heavy showers. The two cocoanut trees nearby seemed slightly the worse for the heavy demand upon them for leaves. Suspended from a tree before the house by a wire were some thirty jawbones of Pua, upon the rest of which someone had feasted amply.

Shortly beyond there, we left Teihu digging with a sharpened stick for Ofai (yams). Tafai and I went on to a place where Feis were abundant, and where signs of Pua were frequently seen. There we spent an hour or two hunting around for birds,of which we obtained one kingfisher and three doves. We met two pigs on the trail, but too far away to reach with bird shot. Later, while calling doves, we saw a large one rooting around, but he did not come near us, and we were unable to stalk him. But we did not come home empty-handed, for Tafai saw some ripe Feis, and, climbing the trees,- I do not yet know how he did so,--he cut out the cluster of fruit from the heart of the crown of three trees. They made quite a heavy load. When we reached the vicinity of Teihu, some calling brought him with two young and one large old yam Ofai. Then we proceeded down the trail, until, arriving at the "big-pig" house, Tafai found a basket made of cocoanut palm leaves. This he left in the trail for his son to carry. At an orange grove Teiha climbed into the tree-tops and threw down enough oranges to fill the basket. I stood below and caught them, much to the delight of Tafai, but, of course, it was nothing whatever to one descended from baseball-playing Americans. Along the trail we shot a kingfisher, but he fluttered far out into the canyon while falling, and we were unable to find him.

Arriving in camp, I conceived the idea of Prawn hunting

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Arriving in camp, I conceived the idea of trying hunting

for dinner. Tafai produced hook and spear, and he went down to the river for eels, returning about six o'clock with two good sized ones, which are still broiling over the hot stones, as I have described. They came out deliciously cooked, with a flavor something resembling boiled lake-trout. The Feis are better this way than baked, but still I prefer them fried,with water added to form their own gravy. However, the fact remains that the Tahitian can live by means of his machette alone in these bounteous hills.

Temperature: 73° F.

Barometer: 28.48 in.

Rdg: 1225 ft.

October 18.

Tuiro--name of large stream.

Aana--creek by house.

Puneroo--covering whole valley.

After breakfast this morning, we packed up and moved for the plateau across the Tuiro river, where the shearwaters nest, as near as we can make out from our guides by the sign language, and what Tahitian we have learned.

Mr. and Mrs. Beck went on ahead, followed by Tafai. I dropped behind with Teihu, and we descended to the mouth of Faa, then took a very steep trail, which he apparently knows. The others took a cut-off from somewhere in the neighborhood of the bamboo grove. Although theirs was a short-cut, it was hardly more than a pig trail, according to them, and they envied us the easier, though longer, route we followed. When we arrived in camp, Tafai had our house all newly thatched, and was building a small one to one side for himself and son. We are in the midst of Feis, and are camped beneath orange and lemon trees, so our "wants are few

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here below, nor want that little long", for we just step out from the house and help ourselves. I am getting now so I can easily dispose of more than one dozen oranges in a day. In fact, I have eaten that many at one sitting, and not the smallest ones on the tree, either. Nor are these wild oranges in any way inferior to our cultivated ones. They are as large, and I believe have a much better flavor. Their chief advantage is, of course, that they are free and obtainable almost upon demand.

Mrs. Beck thinks the lemons helped, at least, to make her sick. Well, it is possible; but I have eaten freely of them, with perfectly good results.

Mutto--mountain south of valley, faced with long cliffs.

ihu--tall stout stalked grass, with alternate linear leaves half an inch broad. Used for making straw hats.

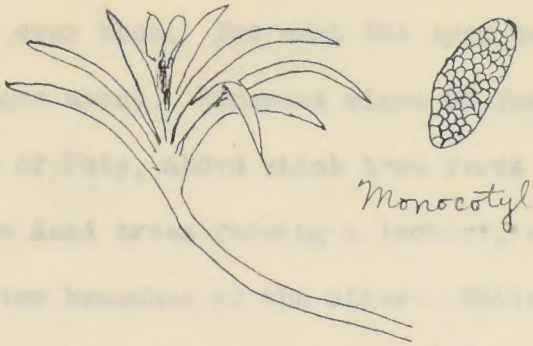
Faa--up which trail goes after crossing Tuiro.

I have said little about the geological structure of this island, because it is quite of a oneness through out. It undoubtedly is of volcanic origin, because the entire mountains are of lava rock, rather coarse grained, as a rule, but very hard, as at the Diadime, where a thin sheet has resisted the wear and tear of ages. Of course, if the valleys of the Puneru and Fantana were craters, as they appear to have been, the one quite small and the other enormously long and broad, that particular wall was between two successive, or perhaps coincident, fires, and might well have become hardened to a high stage of resistance. The lava formation is much easier explained than is the red volcanic mud on the hillsides above Papeete. Was it made friable by lava flowing into the ocean?

Or did the ocean fill the crater, and was the mud then exuded? It is filled with bubbles of air just as lava is.

A dug-out canoe is called "waa". They come up into these woods and hew them out of Bahia Leite.(Hibiscus, yellow) and carry them down to the lagoon. We just passed a large one over by the Puro or Baahi, and a small one here along the trail (iwi) up the ridge west of Faa creek.

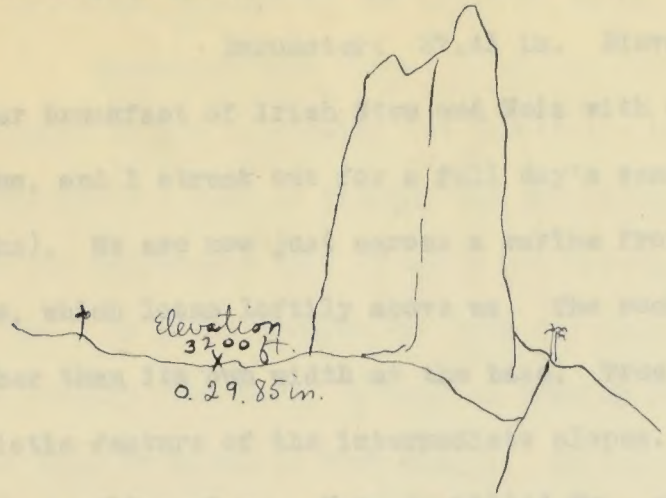
This is a steep trail, long and waterless; of course the sun being out, and the humidity high, makes a noticeable difference. Last night was starlight, and to-day is almost clear, with but a few small clouds in the sky. If we only find the shearwaters, it is probable we will remain most of this week, getting back to Papeete about Saturday. Sunshiny weather should make camp life more cheerful. Mrs. Beck has promised to remain in Papeete for the next mountain trip, which will help matters considerably. This kind of a life is no place for particular people.



The trail takes along the razor-like summit of this ridge between Faa on the SE and on the NW. Along it were some trees with small ovate leaves ∅ and flowers resembling Hahea , the pistils being red and long, about one centimeter, the stamens red and shorter, the corolla of the flower being but two millimeters in length.

Stamens ten, petals five.
peti (Purata)

The Diadime from camp. The cross shows where Tafai and I ascended to ridge.



Barometer: 27.35 in. Elevation 2300 ft.

Mr. and Mrs. Beck, Tafai and I made a two hour excursion over the face of Matau Maurau, in search of shearwater nests. We found two old ones, where evidently Tafai had seen them before, but no sign of fresh nests. A very difficult climb, in which we reached an elevation approaching 3000 feet, the highest we recorded being 2800. Were it not for the vegetation along these cliffs, one would be loath to scramble over them. But what the eyes cannot see, the knees will not shake about. Numerous signs of Pua all through the extensive growths of Feis, above which tree ferns predominate. At camp there are two dead trees forming a lookout, one being caught in the crotch of two branches of the other. While I was up there looking around, Teihu came up and sat out on the farthest point. This evening we again located there, and saw the beauties of the jungle and mountains by moonlight. I yelled a bit and made various noises, getting some good echoes from the neighboring cliffs. He sang us several Tahitian songs, which are very melodious and interesting. Heard no signs of shearwaters tonight--ill luck to our journey!

F 67

October 19.

6 A.M. Thermometer: 62.2 F.

Barometer: 27.41 in. Elevation 2240 ft.

After breakfast of Irish Stew and Feis with one biscuit, Tafai, Teihu, and I struck out for a full day's search for shearwaters, (Noha). We are now just across a ravine from the base of Le Diadime, which looms loftily above us. The rock is fully four times higher than its own width at the base. Tree ferns are the characteristic feature of the intermediate slopes. The guides are enjoying my binoculars. Here we killed Upa, and saw one other.

Tepara is the name of the stream below us. The altitude is about 2275 feet. Myna plentiful and noisy. There is a very small insect like a grass hopper, about 3mm. long, with antennae 1 cm. in length, a very rapid traveler for his size, with a good hop. Beneath an orange tree, they are abundant. Green-yellow and colorless or hyaline.

Beneath an orange tree on other side of ravine, which Teihu is ascending to get us a supply of oranges, because above here "cite pape"--no water. Apparently we are going for the base of the Diadime in search of shearwaters, which I hope we find, else this excursion will be rather of a failure. The doves and kingfishers and four swallows will hardly pay for the ten or twelve days' time. The Diadime becomes all the more impressive as one gets directly beneath it, and is obliged to look nearly vertical to see its summit. The face of Maurani is itself rather steep, especially since it is in the neighborhood of three thousand feet of cliff.

I am going to let them carry a basket full of the oranges. I'll carry the empty bamboo bird cases, for at least a dozen onanes await our continuation of the journey. We will probably lunch be-

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neath the Diadime, if successful certainly, digging out birds. If unsuccessful, perhaps on the cliff of Maurani.

Elevation 2500 feet. Up in the ferns below the rock, where I dropped my pen in drawing the binoculars out of their case. Quite as difficult a task as finding the proverbial needle in the haystack, with the difference that it would not have availed to sit down upon the pen. My yodel brought Mr. Beck out upon the lookout; we can see camp plainly from here. A hawk is soaring high above the Diadime--truly king of birds is that family. He later alighted on the Diadime. What a superb place for a nest, safe from all other classes of life, for I doubt if rats attain that summit.

Meiau--seen at distance to the W. by S.

Elevation 2650 feet. Ferns, both tree and shrub and leaf only with "ieie", predominate, in places being so dense that we scramble over the tops of them. "Ieie" has the "cones" eaten out by birds, according to Teihu, but looks more like the work of rats to me.

Tafai has ascended the ravine to the very base of La Diadime, while I obediently remained behind on a ridge. The sheer rock commences about four hundred feet above here, and rises vertical for at least 1000 feet. I am perched here on a tree, gazing out over the valley. The dense carpet of tree tops upon the plateau below is a most fascinating sight. Some are dark green, others a pale gray-green, with here and there beds of yellow-green, broad-leaved shrubs showing up. Directly below me, on the slope descending to the plateau, the tree-ferns spread their noble crowns at the tips of their graceful stems, while beneath them is that entangled labyrinth of various plants through which the guides are hacking trails. What is more inspiring than to be on the ridge of a mountain gazing down

neath the Diadime, if successful certainly, digging out birds. If unsuccessful, perhaps on the cliff of Maurani.

Elevation 2500 feet. Up in the ferns below the rock, where I dropped my pen in drawing the binoculars out of their case. Quite as difficult a task as finding the proverbial needle in the haystack, with the difference that it would not have availed to sit down upon the pen. My yodel brought Mr. Beck out upon the lookout; we can see camp plainly from here. A hawk is soaring high above the Diadime--truly king of birds is that family. He later alighted on the Diadime. What a superb place for a nest, safe from all other classes of life, for I doubt if rats attain that summit.

Meiau--seen at distance to the W. by S.

Elevation 2650 feet. Ferns, both tree and shrub and leaf only with "ieie", predominate, in places being so dense that we scramble over the tops of them. "ieie" has the "cones" eaten out by birds, according to Teihu, but looks more like the work of rats to me.

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into the vales and canyons below, especially when the view is so entirely different to what one has hitherto beheld? We can see the lagoon and the breakers and a considerable expanse of ocean beyond from here. Clouds are already hanging about these mountain peaks in their characteristic manner. The opposite wall of the Puneroo canyon is composed of almost horizontal layers of lava which outcrop frequently as precipitous ledges where vegetation is unable to find the tiniest crevice. Directly opposite is one of those lines of points forming a ridge ascending clear to the summit, which appears truly knife-like from this point of vantage.

Tuturanui--spider. Puauwi ? --web. p. 271

I have frequently noted enormous masses of spider-web. We are stopped for wind beneath the ferns near one of them. One point of attachment is fully two meters below the highest along the trunk of a tree fern. The rock spreads to another tree fern fully two meters away, and has side attachments to everything within that area, and one meter on either side. On this one I can count no less than eleven spiders, ranging from two centimeters leg spread to at least five or six centimeters, measuring fore and aft legs. The food supply seems to be well disposed of, but a few small insects are in it. The web apparently is not built upon any definite design or plan, but is very irregular and is composed of several closely woven lace-like meshes strong enough to support the .32 auxiliary bird cartridge we carry.

The spiders are very beautifully ornamented, all with the same design, and upon closer examination I find numerous very small ones only a few milimeters in length; a very interesting place for the entomologist and spider collector.

Tafai, whom I had supposed was merely searching for shear-

waters, halloed to us from that knife-edge precipice which connects the Diadime with Maurani. That threw me into a rampage, for when there is a view to be seen from a mountain height I like to see it. Teihu signalled Tafai to remain there, and I struck off in a white heat; and the exercise of the ascent did not help it much. Here I now am, after a climb equalled only by one I once made on a peak of the Tetons, which I did not succeed in ascending. I am now having the pleasure of gazing down the valley of Fantana from the base of that rocky coronet which crowns the divide between that valley and the Puneru. Three thousand feet of canyons on either side of me, and nothing but the tops of tree ferns immediately below this knife of rock! Just where the craters were on this island I will not say. It appears to me that the likeliest supposition is that each valley was at one time a sub-crater. But so many millions of years ago that the streams have opened them out into gorgeous canyons. Off to the NE I can see in the ocean blue strips of white breakers which are perhaps atolls and coral reefs.

What a crime it would have been to have missed this view! But I paid well for it, and am now all aquiver. Tafai met me at the worst place with the twenty feet of rope he brought this morning. Before then I had some good climbing, frequently finding myself in the opening of a former landslip where a jar might have started something. One time I was obliged to crawl flat on my stomach along such a place, and then only by putting all my pocket loads of shells and birds on the outer side of me; only twenty or thirty feet directly below, but plenty of good rolling below that. However, nothing happened, so why tell about it? Many a man, no doubt, has climbed far worse cliffs than this one for fame and

glory, and even bird nests. We have found no shearwaters.

That portion of Fantana just below us is a typical cirque, and, by the mere addition of less than twelve degrees between two ridge-points of about equal height, could be closed into a splendid crater.

The ridge we are on runs about WNW from the Diadime, which faces NW by N, Papeete lying NNW. Mouth of Puneru is WSW, Maurani WNW, Aouri NE by N but under a cloud. Tree ferns apparently run to the summit of the high peaks. The (Purata) and (Apeti) are here with the ferns, and (ieie) whose help up the hillside I thoroughly appreciated.

We are devouring a can of corned-beef and some hard tack. I am paying with thirstiness for being too lazy to carry some oranges. How good they will taste when we descend!

Tafai scared a bos'un bird out from the cliff in climbing up, but he did not find the nest. Here is all the steepness of the Rockies, with the verdant clothing of the tropics--all surrounded by the opalescent ocean and the cloud-flecked sky. What a marvellous view one would have from the highest peak! But he would probably be obliged to camp a week for a clear day. We are to descend by another route; I hope it will be less dangerous, but it is all in the game.

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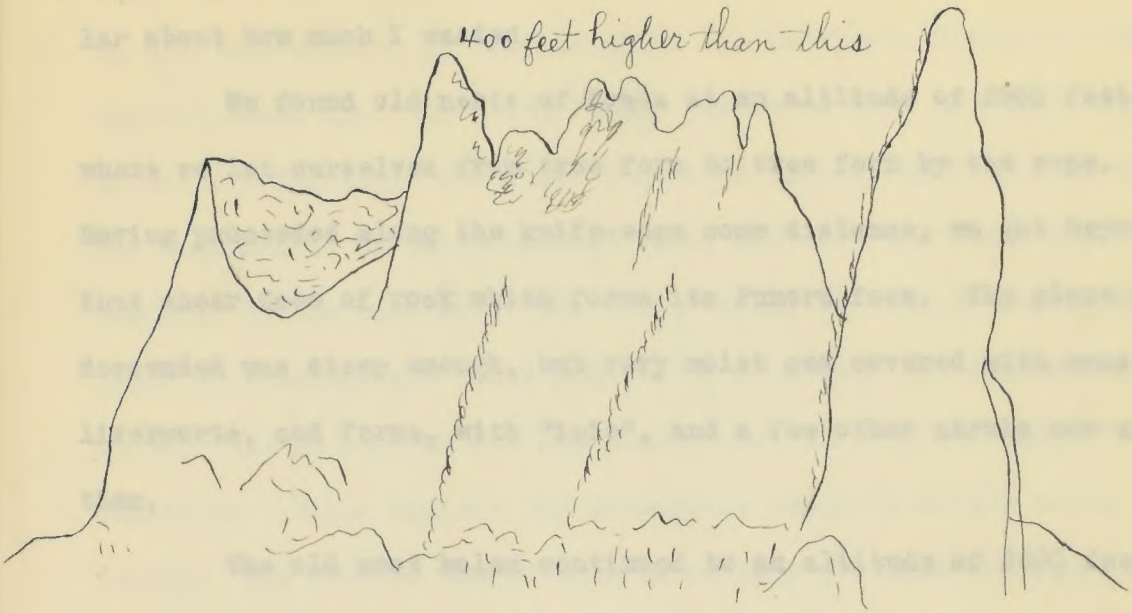
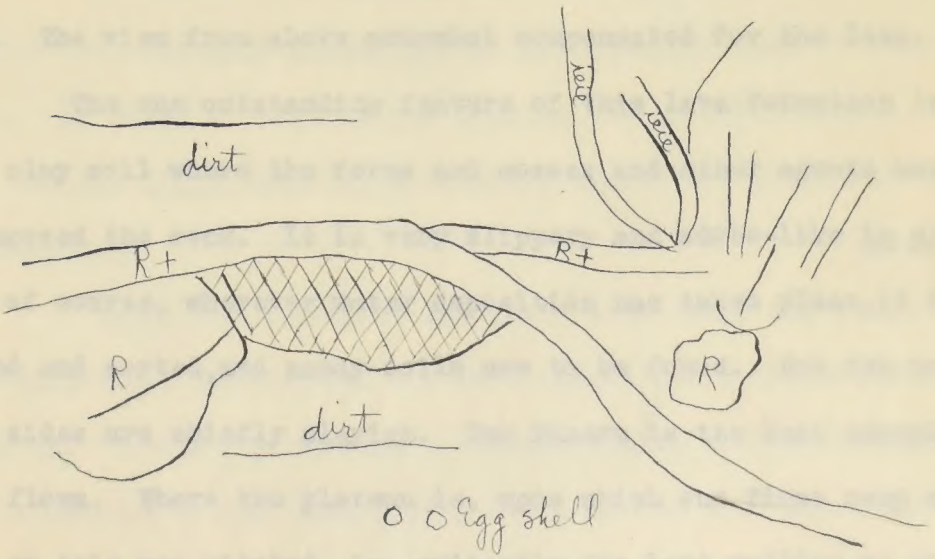
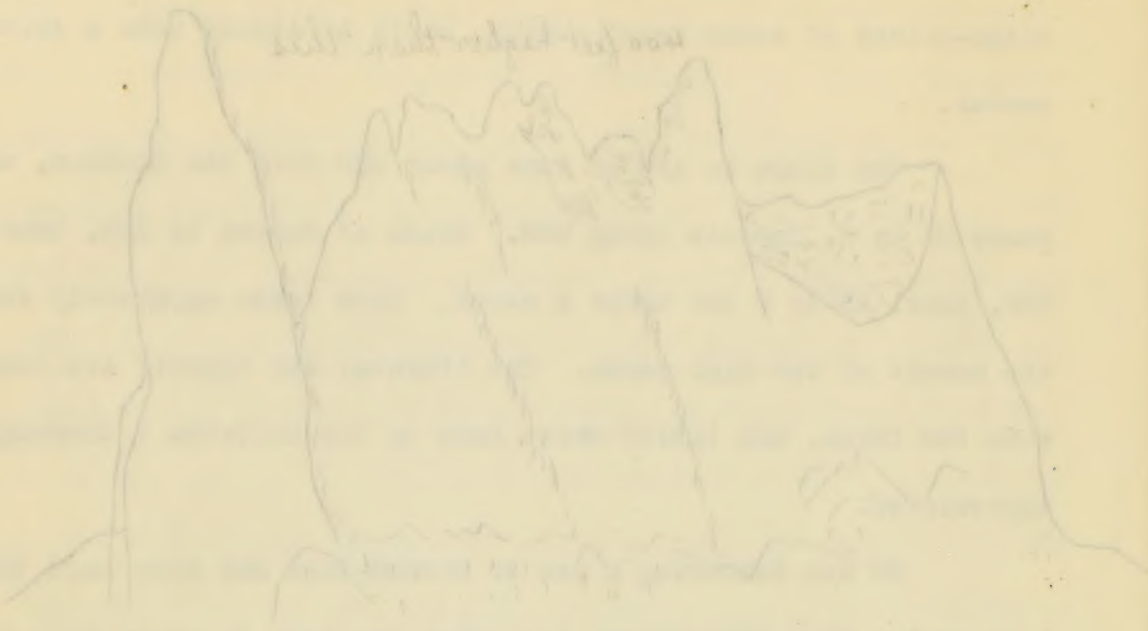
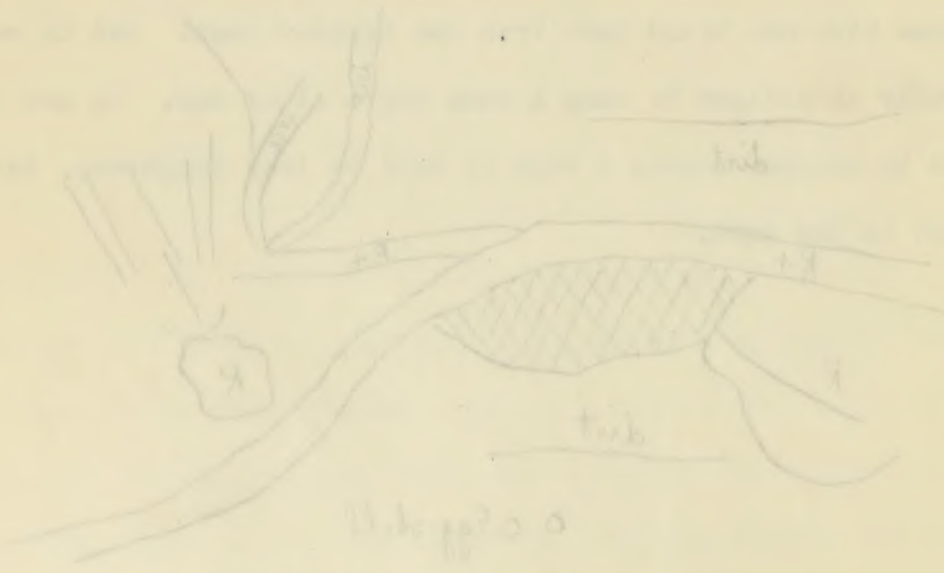


Le Diademe from knife-edge connecting it to Maurani.



Proved to be an old hole.





First orange tree, where at we indulged freely of the delicious fruit; and when were oranges freshly picked from the tree more palatable? I ate the greater part of mine, but was not particular about how much I wasted.

We found old nests of Nohua at an altitude of 2900 feet, where we let ourselves from tree fern to tree fern by the rope. Having proceeded along the knife-edge some distance, we got beyond that sheer face of rock which forms its Puneru face. The place we descended was steep enough, but very moist and covered with mosses, liverworts, and ferns, with "ieie", and a few other shrubs now and then.

The old nest holes continued to an altitude of 2600 feet, and Tafai thought he heard a bird , but could not locate its hole. We dug out two old nests and found feathers mildewed in them, at least one year old. Perhaps it is too early in the season for the birds to be nesting, but surely Beck would consider that.

These orange trees appeared at 2500 feet, where we have rested at length, quite disgusted with our unsuccessful hunt for Noha. The view from above somewhat compensated for the loss.

The one outstanding feature of this lava formation is the fine clay soil where the ferns and mosses and other agents have decomposed the rock. It is very slippery and adobe-like in situ, but, of course, wherever water deposition has taken place,it is sifted and sorted,and sandy soils are to be found. But the mountain sides are chiefly clayish. The Puneru is the best example of lava flows. Where the plateau is, upon which our first camp as well as this was pitched, is evidently the last welling up of molten materials that choked the crater. The Southern wall, however, shows splendidly the various layers of successive flows.

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The entire lack of marine deposits anywhere, (except in regards to the red-clay hills, which may be delusive to my inexperienced eye, and are perhaps ~~are~~ but decomposed rhyolite as is found in the Yellowstone) is convincing of the Darwinian theory of subsidence based upon the coral reefs. It seems much more feasible to believe this was once a Mt. Shasta or Tacoma, standing high above its continental or large insular base, and that the whole has been engulfed by the sinking of the ocean floor, leaving a few volcanic peaks protruding, and atoll ladders erected upon the sunken mountains, than to suppose for one minute that this island and a few others have risen against the tremendous pressure of the ocean depths. The extreme age of them is further evidence to that effect. From my life in that great volcanic region of the Northwest, I would say that this is much older than Tertiary. Still, there is one drawback to that comparison, because that region has been practically dry since the Ice Age, while here have been tropical rains in abundance to wear away the rapidly decomposed rock.

If anyone ever imagines that the nights in the tropics are always hot, let that person ascend two thousand feet in Tahiti Island. At three or four in the morning it is quite chilly, and, as one carries light bedding, he usually feels it. A blanket is well appreciated.

Tafai and I brought some Feis into camp, and found Teihu had more there than we can eat in a week. Saw a few doves returning, and I forgot to mention it--while cooing once as we descended the mountain, a hawk came flying straight for us. But I had the gun slung across my shoulders and empty. He wheeled a few feet away, and would pay no attention to any manner of calling afterwards.

Feis go well with salmon,and rice with butter and sugar makes a fair desert, especially when one has had a day of mountaineering with Tafai.

This evening a small pool was located in the trickle of water which passes camp. It served well as a tub, and in the cool shade of Feis and orange trees, the mossy banked pool was appreciable after a sweaty day. Early to bed because tired, and early to rise to listen for shearwaters in vain. So the program to-day is to move back to the last camp and hunt up the main river canyon as high as possible to-morrow.

October 20.

Mr. and Mrs. Beck had a mosquito chase at three this morning, and, awakening during that excitement, I decided to arise and take the outpost for shearwaters. Not a whimper could be heard from the crossed trees. I am now praying my candle will hold out until daylight, when all will be hustle and stir, prior to moving camp.

Our trip has proved rather unsuccessful,in that searching for shearwaters has even prevented us from getting our full number of doves, kingfishers, and swallows. Swifts,rails,wild fowl, we have not even seen or heard.

Our trail moving led across the plateau as we went yesterday, until we came suddenly out upon the brink of the ravine below the Diadime, from which we had a magnificent view. We dropt down the ridge through grass and brush over our heads to the creek below, and descended it until it commenced dropping over water-falls. I missed a small pig twice through excitement, or "Buck-fever", as Mr. Beck said. Below the falls, however, I caught a good big eel with Tafai's machette. We went up over a ridge, where we found the remains of stone walls, which brought the explanation following, from

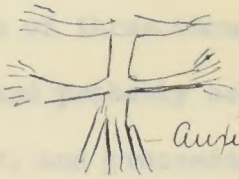
our guides.

Sing, dance; Tahitian festival, rock walls, moss, at right angles on ridges now over grown and fallen down, drumming on bamboo on hill above, according to the Yellows, "mite".

Thence descended to and crossed the river. I was very cleverly evading getting wet, by jumping from stone to stone. One place was very risky and a little too far. Into a deep pool below two rocks the water plunged. I made the farther rock, but my bamboo case of shells fell into the pool, and,in reaching for it, I,too, slipped in, much to everyone's amusement.

On a prominent point overlooking the valley below, and a few hundred feet above the river, we built our third house of Opui leaves. It commenced raining soon after we stopped, and it was with difficulty that we kept things dry at all. But with a good hot toddy to warm us up, we made out fairly well, and slept comfortably through the moonlight night. This is the most artistic house we have yet had, and the only one with a view.

Beside us grows a tall Yucca-like tree, with bayonet-like leaves, and most peculiar auxiliary roots which grow downwards from the trunk.



Before the house grow two oleander-like trees, with very pretty pink flowers upon them. Oranges are a little scarce here, but can be had back a ways from camp. With this rain, it is likely we will give up all ideas of other routes out of the mountains, and return down the Puneru.

Tarona--Oleander-like.

Fara--Yucca-like, pandamus.

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October 21.

Went into wet clothes, and took to the field about 8 o'clock this morning. Tafai and I started for the divide between here and the next valley to the south. We soon arrived at the large creek draining the basin, and ascended thence to the Feis field, where we cut Feis about one week ago. Upa was plentiful, but I missed all shots with the new auxiliary barrel. A little beyond, Tafai signalled Pua, and then a large pig raised up on its forelegs, and stared bewilderedly at us. I took what I considered a very careful aim, but, coming to think it over carefully and honestly, I do not remember whether or not I held at the exact spot of the brains between eyes and ears. The consequence was that Pua went off in a drunken rage. We trailed the pig about half a mile by the blood, but at last the tracks became washed out by rain.

Passed through splendid Upa groves, and failed to bag one directly above me. Shot one Upa and one Ruro this morning. Had a hard job explaining to Tafai where I wanted to go, so just went, and took him along with objections. At an altitude of three thousand feet by the barometer, which had dropped once and probably been offset, I left him to cook some Feis for dinner, and proceeded myself up the slope for a view of the cliffs. Scrambled up through ferns and "ieie" until I came upon a trail, "pua" or goats, perhaps former. Followed it to the ridge at 4000 feet, but a heavy fog prevented my seeing anything but the nearest cliffs during a clear wave.

Returned down via the trail which led me off to the left into some rather steep descents, but arrived at the spot, after halloing half a dozen times. Tafai had a hard job retracing our steps, and, after many false trails and a few mistakes, we struck

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the one leading from the stream back to camp. He had left half of his load of Feis tied to a tree at five o'clock. It was still a little light when we reached camp, wet and tired. A dry change of clothing and some beans, Ofai (yams), eel, and cornmeal mush certainly touched the spot. Went to bed early, and slept the sleep of the tired and weary.

The moon sinking behind the hills at one-thirty awakened me, and for awhile I enjoyed the canyon by the moonlight, then turned over and slept soundly until broad daylight.

October 22.

Yesterday Mr. Beck ran a sliver into his foot, and this morning is quite lame. Nevertheless, the decision is to move as far as possible down the valley.

Leaving camp, we followed closely the trail Tafai and I came in on yesterday, until we reached the Feis left hanging on a tree. These he added to his load, and is now carrying them along with us. We soon passed the large cocoanut-leaf house, mentioned several days back; thence followwed familiar trails to our first house, where we arrived at nine o'clock. Rested there but a short spell. Went on down trail determined to make all the progress possible for Mr. Beck. He is doing well, with two long canes and no load.

We have passed the lower ford in this upper Puneru valley and are now ascending to the plateau of our first camp. He is doing a little better than the men with their loads on the uphill grades, but they keep up with him along level and downhill stretches. It is only ten o'clock, and we may make the bridge by dark.

We made the furthest stream before ascending the plateau, and lunched at 11:20. I came ahead, and have just made a thorough

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We made the fruitless stream before ascending the plateau, and lunched at 11:30. I came ahead, and have just made a thorough

search of the old camp grounds for my spectacles, which were lost the day before in my traveling. I continue to be careless and lose things. From all appearances, we will make the bridge in very good order. Our twelve days in the Puneru valley have not netted us many birds, and none of the particular ones we came after; but to me it has been a wonderful experience, and one never to be forgotten.

Mr. and Mrs. Beck were not far behind me. We have just passed a fork in the trails, both branches of which lead to the cocoanut trees at the other end of this plateau. I put up two signs as to which one we had taken, but Mr. Beck thought it best to stay behind and see that they came this way. An arrow on a tree between the forks, and a tripod of sticks with the elevated end of the longest one pointing down the trail, should suffice to guide anyone.

This is the greatest country for ants I ever yet have seen. One is crawling about this page, not a mm. in length. They are simply everywhere, but none very large.

Where we dined and supped on cocoanuts ascending, the Becks and I were unable to pick up the trail, and, as a very good example of the human being called intelligent, we became convinced that we had taken the wrong trail, and were far away from the right one. I even climbed a tree, and yelled for the guides, whom I heard coming behind us. They soon started us aright. We blockaded against one of those curious bits of stone wall work, now sadly in ruins, which we find so frequently in this valley. Here we at last got an explanation that seems very feasible, in that they were the old Tahitian burial grounds, or Tombs. That would account for all the dancing and pagan festivities before described.

At the cocoanut trees at two o'clock, where I distributed the little water happening to be in my canteen. The steep descent

into the valley was made in an hour, and Mr. Beck has courageously gone on, determined to make the road by dark, three hours hence. Coming out upon points in the descent, we had a splendid view of the lower Puneru canyon. From where we last forded it to here, it plunges through a considerable gorge, with Mt. Maurani rising very abruptly some six thousand feet above on the north, and the plateau on the south. I have figured out that this is where the old crater was closed, two ramparts on either side the river being significant remnants of the old wall.

The guides have arrived with their loads, and are squeezing themselves into the shallow pool of a creek running into the river here. How they do enjoy their water and bathing! They are very cleanly in all their habits observed so far, even in their eating with their fingers. They keep a clean dry change of clothing, and sleep with very light bedding. Tafai wears a woolen pajama shirt. "Tafai" means to "break", and certainly he was well named. Manu says he is probably descended from former chiefs.

With hopes high we go on, and arrived at the bridge of the Puneru about five P. M. The telephone at the nearby French-Native residence refusing to reach Papeete, I left word for them to please continue calling, and to give my message to Manu at the Hotel Tiare. Then I returned to the outfit, and, changing clothes, struck out a-foot for the village. Mr. Auffray and daughter passed in a roadster just as I was about to leave. Teihu went after his pony and cart. I walked less than two miles when a car picked me up,--by my stop-ping it and stepping inside; charged ten francs, but then! I got to Papeete and found the telephone had revived and all was well; so ate heartily after bathing and cleaning up. The "Marama" is in

port, Frisco bound, so we are quite anxious to get our mail ready for her.

The Becks later reported that the car which went after them arrived there out of gasoline, and during the wait they sat out a very heavy shower, which met us just as we reached town. They did not get in until ten P.M., while I made it by six-fifteen. Mr. Beck certainly made a game hike for a man with an injured ankle.

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BOOK II. (Supplement)

Tahiti

Oct. 23-26, 1920.

October 23

Mr. Beck's heel is quite bothersome today, producing considerable pus. He skinned the birds we brought out with us this morning. Until his foot heals I will have to hunt strenuously to keep him supplied with birds to skin. Will make Fantana Monday, and perhaps the gorge of the Puneru Tuesday and Wednesday--the gorge we missed by ascending the plateau along the trail.

October 24

Had a prolonged conversation with a Mr. Norris who has been here a few years. He is an old timer at the telegraph business in America, where he met Edison, Carnegie, Stanford and other notables. Another very interesting fellow, who put me upon the track of two more interesting men, one a permanent resident and business man here, Mr. Stimpson, the authority on the Tahitian language, a Yale graduate and a brilliant man. The other is Mr. Hall of the Lafayette Esquadrille, author of "Kitchener's Mob" and magazine articles, here writing now. Spoke to him about his attempt to ascend the highest peak of this island via the valley of the Papinoo, and also about birds he noticed in the gorge of the Puneruu. He is giving a dinner and dance this evening to the Tahitian friends he has made himself familiar with. A most likeable young fellow, of whom everyone speaks

with the highest praise.

October 25

In spite of the fact that Hall's party lingered on until midnight and kept me from sleeping that long, I arose with the clocks at four this morning, and after much effort got ready for the field before five. The early dawn here, as elsewhere, is the best part of the day.

Just below the water house I bagged a swallow above the trees along the road. Have been watching three white, blue-billed terns all this morning hovering about the tree tops and flitting up the valley. I just now observed them off the road a ways, and have climbed up to the trees above which they were, but probably scared them away with the brush cutting necessary.

The Diadime has certainly a noble aspect from here, lying SE by S up the valley. Will sketch and photograph it from some vantage point farther up. Clouds precipitating a little rain now and then hide the Diadime from view. This East Fork of Fantana is not well trailed; in fact, one is obliged to cross it several times. At one point it goes through a miniature gorge which is very interesting. A small stream coming from the East falls over rocky walls into a vale, where grow breadfruit trees, feis and pineapples; one of the latter I picked for lunch. Not having seen or heard many birds except Myna up here, I have decided to stop and, after eating lunch, retreat.

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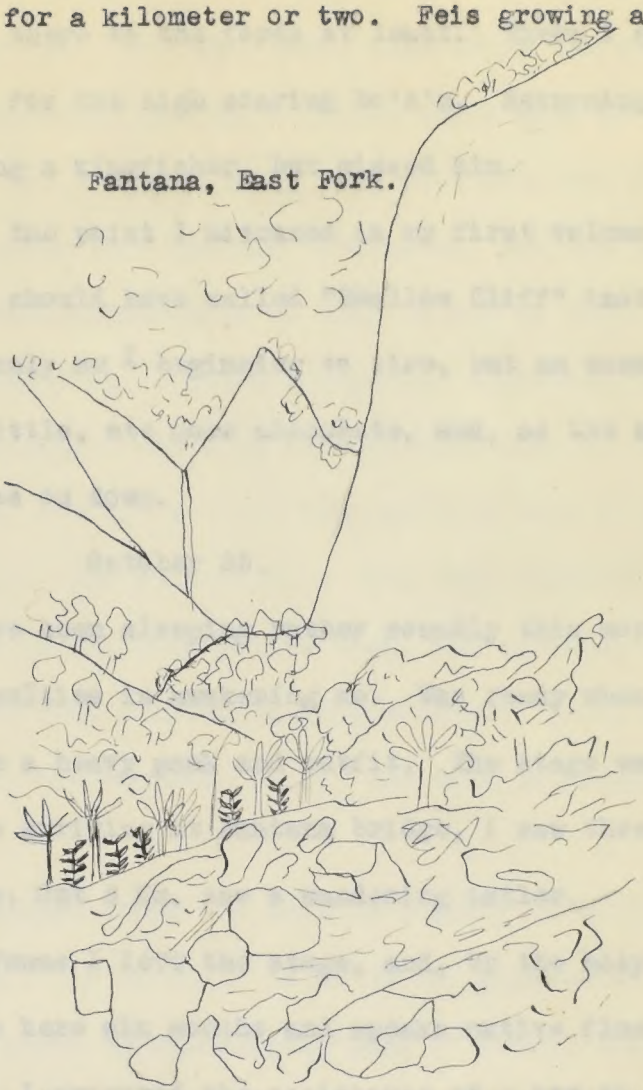
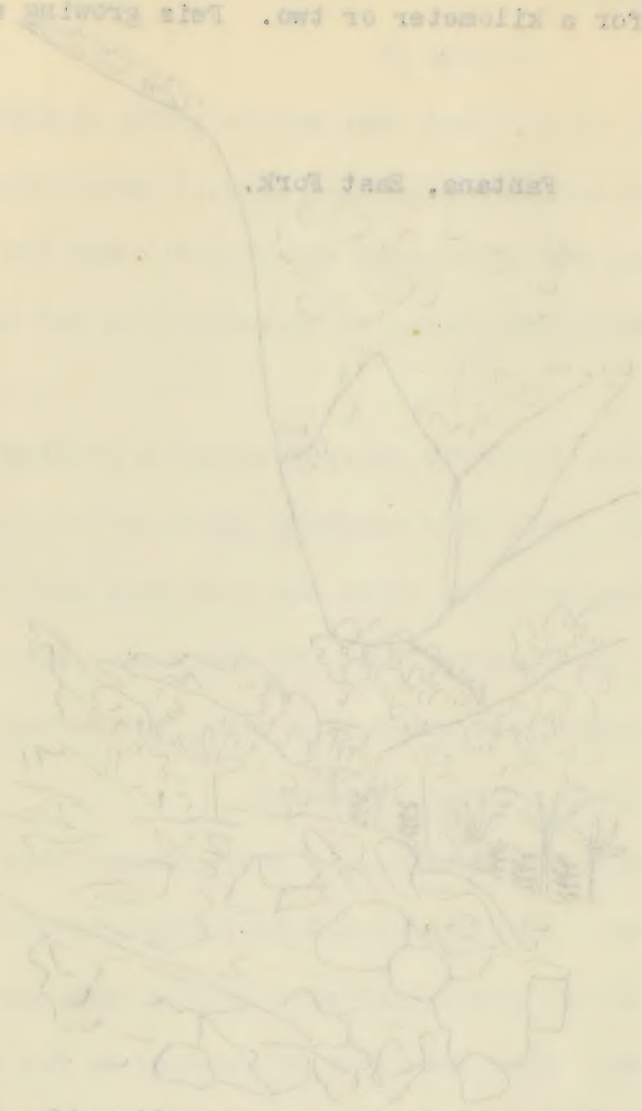
back down the valley for a kilometer or two. Feis growing across the stream from me.

Fantana, East Fork.



Just saw a dove go into tree on opposite side, but have been unable to call him within range. The stream falls rather rapidly here. A hawk flew overhead beyond gunshot distance a little while ago. A dull day, and not much bird life astir. My hopes of finding a new bird to our collection are getting low for today. Hope to get a few more swallows at least, and a kingfisher or so. The dove met me half way, perching in a tree just across stream long enough for me to wing him. Finished my meal and went over to find him quite well except for the broken wing. What beautiful little fellows they are, and what a crime it seems to be killing them!

Back at the bridge over West Fork without having obtained



a thing. Saw one kingfisher. Saw a bo's'n bird a short ways up West Fork, and will go up there to the fords at least. There I saw how futile it was to try for the high soaring bo's'n. Returning, I had my opportunity of getting a kingfisher, but missed him.

Am now at the point I misnamed in my first volume of this journal, and which I should have called "Swallow Cliff" instead of "Swift Cliff". Not only am I beginning to tire, but am unendurably sleepy. I slept a little, ate some chocolate, and, as the swallows did not appear, I came on down.

October 25.

I must have been sleeping rather soundly this morning, because Manu had difficulties in awakening me. Was ready when the stage came along,with quite a heavy pack and outfit. The stage was well crowded. Just before arriving at Fantana bridge, I saw three white terns above tree tops. Out 8 Km. saw a wandering tatler.

At Point Venus I left the stage, and, by the help of a Chinaman who has been here six months and speaks native fluently as well as good English, I procured the assistance of a boy to carry my baggage for me, so we should penetrate a little distance at least, up this valley which Darwin ascended. He called it the "Lua-urna"(?), but the natives do not seem to know it by that name. But how different times are, for, in trying to get a guide, first inquiry was made as to food, which did not worry Darwin's guides at all; and second, I had to wait while the guide ran home for bedding clothes, skin being sufficient for the ancient Tahitians.

This trail, like most others on this island, is merely a few paths across points of land on the inside curves of the river, and the river-bed itself. Well, to barefoot natives, it is sufficient, but hard on shoes.

The first bird was Ruro, but he did not let me get a shot at him. Later flushed "Au", the Blue Heron seen along the beach; he went up-stream, and, watching for him a little later when he flew out from the bank beneath us, I took a hasty wing shot with No. 6 and winged him. Heard another Ruro shortly afterwards, and Upa has entered the lists, but have been unable to call either of them.

A little higher up, I heard a peculiar squawking from the river, but the bird escaped. Watching closely when next he squawked, I located his position, but did not see him until he took flight, when I dropped him with No.6. Was perched in a tree when flushed. It proved to be a smaller heron, with yellow legs, and greenish bill, more of a top-knot, but body a brownish-gray mixture. It is called the Green Heron. Heard and saw more "upa", but have not bagged any yet.

The river washes along the base of a cliff of columnar basalt for about 100 ms. It is fully 15 or 20 ms. high in the columnar formation, capped above by overhanging mass of common basalt one third the height of the cliff. Even on this cliff a few shrubs have found a foot-hold, but it is mostly bare. I am surprised not to find a swallow here. We stopped for refreshments from a cocoanut tree growing opposite the cliff.

Mt. Taoleho: 2630 ft. Rt. of stream.

Farther up-stream found three swallows hanging out beneath a low overhanging cliff; also heard Au, the Heron. Could not locate latter, so fired auxiliary and winged one swallow. Au came flying down valley, and I dropt him, and in the excitement lost track of the winged swallow. One of other two lingered around, until, after three misses on the wing, I got him. Stopped to photograph rock up canyon. A bit farther on, and just above rock, we met a hawk flying low down the

valley. He wheeled madly, but the #10 shot dropped him with a broken wing. He is similar to one seen on Diadime cliff.

We ate lunch while stopped with Amumoa, the hawk, and proceeded but very little farther up the gorge where an immense landslide has in recent years choked the whole place. The river is recutting around the east edge of the fill. Our only path was up over the rocks, but, as we ascended them, I came across a commodious cave beneath two large boulders. Considering this shelter as the safest from similar events, we decided to camp for the night. I set my guide to work with the machette, gathering ferns, and came on over the slide to see what the upper gorge looks like. It looks like rain.

For scenery this is the best I have observed yet. No wonder that Darwin was so impressed by it! I am opposite a stream coming down a ravine in leaps and bounds. I can see two water-falls, and I wonder if that is the stream he ascended. Would like to get higher up and look up that gorge coming down directly from the two highest peaks, but will not be able to make it this trip. I cannot understand the scarcity of swallows and swifts, for nearly every condition is favorable for their nesting. What can their enemies be, other than scientific collectors?

Signs of goats in the neighborhood of the slide are very fresh and frequent. In fact, I kept eyes and ears open, expecting to come upon some, but they are very likely more cautious than Pua.

What a relief it is not to hear Myna at all! Have missed that bird since this morning. I must watch for his appearance in the descent to-morrow. No fruit in here for them. In a little pool at the top of this slide, fully three hundred feet above the river, are prawns and the rock fish. Was another swallow here. Ruro seems

scarce in this narrow gorge. What a tremendous mass of rocks compose this slide! Yet it is well at rest, and our cave is probably as safe a spot for the night as there is in the whole canyon above the columnar basalt cliff. We saw many piles of rocks with fresh unweathered edges, showing that the walls are continually giving way. It takes a tremendous amount of time to dig such deep canyons, but it no doubt takes many times longer to wear mountain chains into Peneplains. A fact hard to realize is that the most rugged mountains are the youngest, while rolling plains are probably the oldest, as in Africa and Canada where the archaean rocks are truly aged. This volcano, no doubt, was of comparatively recent geologic history, because of the fact that it is so rugged. Where vegetation thrives upon the slightest foothold, and so helps to decompose the rocks and tear them asunder, and where warm tropical rains are the rule and not the exception, erosion is likely to be very rapid, especially such erosion as the scouring of deep gorges. My guide is apparently quite afraid of rocks tumbling upon him, but landslides and lightning are like old age--very probable to get you sometime, and not to be feared. So we will live on unless our days are numbered one,--if so, we will need no burying.

October 26.

Are we trapped? During the night it has rained considerably, except for a brief spell while the full moon shone resplendently down into the gorge, and gave me one more moon-light scene to remember. But has the rain and the consequently raging torrent where the river was trapped us? The rain has increased ten-fold the danger of slides, and a small one just crashed into the river above here. But what I fear worst is the muddy torrent where the irregular bottom cannot be seen.

But "present fears were less than horrible imaginings", and, although we were obliged to wade at times well above our waists, still we were able to wade. Fortunately, I packed the birds safely in the blanket, and clothing and camera, glasses and everything except shells and permit in the canvas, and as they were held on the shoulder-pole, they all kept dry. Here is another marvelous mountaineer. Oh, that I were blessed with feet like theirs! The soles to my hob-nailed boots being thoroughly worn out and disconnected from the uppers, I was bothered considerably, while he went on unscratched. But our petted feet have lost all the toughness they ever did have.

Of bird life I heard another green-billed heron, about the same place the others were; also opea in several instances, and three wandering tatlers. Ruro again this morning, and just above the cocoanut plantations, at first ford, two large blue herons.

We caught the stage all right, and I commenced to ride in, but over the bluff point, got out and followed the coast line in. Was unable to get a blue heron, though I saw half a dozen or more, many wandering tatlers, and one or two terns. Upon arriving at my canoe friend's, I took his canoe. Rowed after one, but it flew. Another lit upon reef sign, so I went after it, but it flew. Went on out to reef in spite of roughness, but I am no expert at canoeing yet. Very choppy lagoon. Returned and rescued a canoe adrift. Shot a young tern just after landing. Rowed out for him without my gun, and of course his cries attracted another. Landed and loaded, but missed him. All the same slate-gray backed, black-capped, yellow-billed, like one Mr. Beck caught some time ago.

Having walked barefooted along the beach, I am thoroughly convinced that shoes are necessary for me at least.

At hotel had a much needed bath, and later took tern down to Mr. Beck and discussed to-morrow. We decided upon one day trip, out 4 km. by stage south-westward, and up stream that heads near head of Tiapoerno, very likely the one I started down when trying to ascend ridge west of Papeete.

Certainly if the former expeditions failed to penetrate the mountains, ours has not failed in several attempts, but of course I have not reached very high altitudes as yet. Must get some rope-soled shoes for this river work; good leggins is all I hope to obtain from my old boots. Again I wish for feet like the native Tahitian has.

I should have mentioned this morning that the native boy woke with a jump when some rocks crashed into the river shortly above us. But our roof rock made me feel quite safe.

The amount of scenery that exists on this small island is phenomenal, to say the least. Of course, with a firm core of rock in the center rising seven thousand feet, and with little less than twenty kilometers (12.5 miles) for the longest river to travel to sea level, and add tropical rains and weather--something serious is bound to result. Let anyone who thinks otherwise try to ascend Mt. Orohena (2232 m.or 7254 feet). Hall and some companions tried it, but never the Diadime which is only 1239 meters (4020 feet) high, and is certainly as magnificent and formidable a rock as one is likely to see anywhere. Enough of our pictures were successful to show it up fairly well, but they have a little too much of the personal element to satisfy my taste. Orohena and her sister peak, Aorai (2065 m. or 6711 feet) are perhaps higher; but the visitor to Tahiti, at least if he ascend the Punaruu, will remember the Diadime and not the others.

BOOK IV.

Tahiti

Oct. 26-Nov. 4, 1920.

October 26.

I went down town and bought maps (6Fr.) and rope-soled shoes (11 Fr.). Took stage out to Outumaaro, they carrying me beyond the creek where I wanted to stop. Walked a little farther and took road inland just beyond 8 km. post. Followed it to the home of a young fellow who picked me up at the road. He climbed a tree and threw me down two cocoanuts. While drinking milk of one, a hawk circled around neighboring Chinese place. I assembled shotgun and tried to stalk him, but there is one variety of birds which must be approached with caution. He left the neighborhood at my approach. Returned to my cocoanut feast, and then peeled some swollen shells to fit the chamber of gun. The lad came along with me into the hills. It is interesting to see an intelligent youngster. He seems to know all about the dry gulch we are ascending.

One upa evaded us, but here beneath the Banyan-like trees we called one successfully and bagged it with first shot, much to his childish pleasure. Myna plentiful, and a few weaver birds. Nona, the mosquito,with black and white legs held high while boring, also sufficiently numerous.

We found a large hairy-legged hermit crab here, perhaps six hundred feet high and dry. Some people in the future will find

his shell, and wonder how a marine mollusk ever got so high from the ocean. "Ena", the lad called him. "Mouti", he calls the chickens running wild here. We can frequently hear their crowing, and even cackling, on the lantana entangled hill-side, where it would be folly to attempt hunting them. Having breathed a spell, I am going on up as far as time or this trail will permit. Rope soles are hard on the feet.

We ascended to the top of a fern ridge, and there ate lunch. I photographed Morea and the lad looking through the field glasses. Deciding to go on for Pogue Pie, I let him return alone, since he seemed not the least afraid. Gave him 1/4 Fr. which, plus the 10 cents for the cocoanut, should make him feel rich among his fellow play-mates.

And I went on--and on one hour of hot mid-day sunshine through that arid belt of low ferns, with here and there Lantana securely located. At the first shade, I lay down and enjoyed a good rest.

From the next vantage point I decided that the trail was not going to connect with that one which I followed a month ago, east of Mission Valley. As I had looked over the country with my glasses, I decided upon two modes of procedure,-one to join the old trail and descend that ridge to Papeete, the other to descend the stream and valley heading there in the Feis patch, and hike in from Ontumaaro. My only chance of catching the stage back would be to retreat over the unprolific trail I had ascended, which had netted me but two doves.

Then I saw something which decided my action for awhile, at least,-- a spread of bull-rushes, which meant swampy ground and perhaps the last retreat of the little black rail. So I left the trail in some Feis and struck out for the head of the Ontumaaro and the swamp, which I failed to find the first time. But my short cut proved to be so long that I now commenced to worry a little about

getting out before dark. So I struck down the bed of a small stream, which led me through considerable Lantana to a waterfall, where I was obliged to work my way around the cliff about thirty feet high.

Of two hills, chose the southern slope because Lantana thrives best on the drier slopes. Upon the left ridge, which was well overgrown with Lantana, I saw again the bull-rushes, and in spite of the chaparral I thought I might as well descend through them as any way; so I swung down by the roots of "ieie" that way. Met Lantana and became quite attached to her most of the time from there to the swamp.

Not finding any bird life there, and noticing that it was already four o'clock, I started for the sea level. Lantana! Lantana! Lantana! How well I know thy ecological conditions! Passed through more swamps after intervals with the familiar and coherent shrub. But, by cutting a long forked stick and using it in one hand and the shotgun in the other wherever I could not crawl beneath, I snowshoed over it. A good long pair of Norwegian skis would be just about the proper thing. I would like a picture of myself, crawling over the top of that cat-clawed chaparral. Finally a stream organized itself from the bogs, and down its bed, without so very much machette work, I progressed.

My fire, for by it I anticipate a long night, burning low, I just took time to paint Lantana's embellishments of my hands with iodine. The surest way was to cover the entire backs of my hands and fingers. May Lantana never be sold in California as a flowering plant, lest it add to the terrors of our chaparral there. But I would probably have succeeded in reaching the road and thence Papeete in spite of----. A rat just interrupted me by meddling with my foot; I will not say what his intentions were, for I was not scientific enough to carry the experiment farther. Besides, the life histories of the

Norway rat, even in a tropical island, are not subjects for an ornithologist, but I may accommodate him with a little bird shot if he pesters me again. There, I believe, is the chiefest cause for the shortage of birds on this island, where once they were quite plentiful. It is too bad I did not take time to catch an eel, for my fire is now a marvelous bed of glowing coals, and very hot.

When the rat interrupted, I was going to commence telling about the waterfalls I met on this second creek. There were at least four, and I am camped for the night above the fifth. One was fully thirty feet high, and the fourth might have been more. This one is not the worst, but it was too dark to tackle getting around it.

And, of course, we had to have our afternoon rain; that seems inevitable at this time of the year. It will be having me add a heavy rain-coat, or bronchitis, to my already over-loaded pack. What with the gun and shells, camera, field glasses, canteen and bird basket, I have quite all I wish to carry during the heat of the day. I think I will have to try tying the stuff on the ends of a pole over my shoulders; that would at least not choke a man.

So I stopped for the night, and am now enjoying the comforts of a very hot fire, including the blessing of a few sticks giving enough light to write by. Stars were out a bit ago, but seem to have retreated. The main thing about rain would be that it would prevent my writing. As for the wood, I have a good big log of it which will last well through the night, I sincerely hope. I may get too sleepy to write, but will likely find it cool enough on the side away from the fire to keep me awake. If my ink lasts I'll be a happy man all night. The Becks will worry, but it cannot now be helped. I've found a very secluded marsh anyway, and, if he'll let me, I'll bring camp and kit and search it thoroughly for rails.

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Slept until almost three, but it is a little too cold,or chilly at least, to slumber in comfort now. So I am up and using the wood I so liberally cut last night. It is beautifully moonlight, and Ruro breaks the woodland solitude every few minutes with his staccato calling. Although I have not yet been bothered by the constricting pains of hunger, I believe I shall be able to eat when I reach food this morning. A can of salmon, or Pork and Beans will taste very well indeed.

Last evening, in cutting wood, I found phosphorescent worms in it. They appeared like the same as I found a year or so ago in the earth beneath an oak tree at Stanford, and while their glow continued I saw another bit of light approaching through the air. After my fire burned to give light, and the moon came out, nothing of that nature was visible.

There was a particular note about the gorge of Maura that I think I forgot. Myna appeared no higher up the bottom of the gorge than the farthest Vanilla Bean plantings, probably because of the lack of food in the gorge itself. The absence of them may account for the comparative frequency of other birds. I hope that rule holds out as to these swamps. Pig signs are not noticeable here; it would be rather wet for ants, so rats are the only natural enemy he would have.

In the west the moon is sinking, while in the east the day is dawning. Soon it will be light enough to pay my respects to Ruro before leaving his water-fallen valley. No wonder the natives enter over the ridges on either side. I shall both enter and depart that way next trip to the marshes. But the night passed very pleasantly, and I am now well dried out, clear to my rope soles. I think I'll spend the early morning dove calling and hunting Ruro, and that will give the sun a chance to come out for a photograph.

I do not remember having mentioned Mouti (Moa oviri), the wild chicken, two of which I saw briefly yesterday; the crowing of the cocks being a very prominent part of this mountain life. The first one ran from the glen up which we ascended, and the second one, with loud scared cackling, took flight and wheeled overhead. I might possibly have dropped her but for the gun meeting Lantana in the aiming. I may not be in the vicinity of any this morning, for certainly they should be crowing. I am quite at a loss whether they are the common barnyard variety taken to the hills by the sound of their crowing and cackling, or the wild jungle fowl indigenous here. Only a specimen will prove the matter either way.

I am quite loath to leave my comfortable fireside and plunge once more headlong into the damp and formidable woods, but no doubt the Becks are worrying about my absence,-- which I have forewarned them not to do on just such account as this,-- but they will worry lest something serious might have happened to me. Give me three days' grace, say I, and then it really is not time to worry. What good would worrying do were my leg broken? A searching party would have a nice job following my trail, I could assure them of that; but I did leave tracks through the Lantana, even as it left tracks on me. My hands are sore and stiff this morning, and the heat of the fire hurts the scars.

I get no response from calling Upa, which kind of upsets my plans of hunting just here. Ruro, himself, is not so bold by daylight. Well, I have a good long day ahead of me and some very beautiful scenery, which should make the trail seem shorter, but will, of course, lengthen it out.

October 29.

The Briars of Lantana.

I do not remember having mentioned Mouti (Moa oviri), the wild chicken, two of which I saw briefly yesterday; the crowing of the cocks being a very prominent part of this mountain life. The first one ran from the glen up which we ascended, and the second one, with loud scared cackling, took flight and wheeled overhead. I might possibly have dropped her but for the gun meeting Lantana in the aiming. I may not be in the vicinity of any this morning, for certainly they should be crowing. I am quite at a loss whether they are the common barnyard variety taken to the hills by the sound of their crowing and cackling, or the wild jungle fowl indigenous here. Only a specimen will prove the matter either way.

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October 29.

The Friars of Lantana.

A hornet buzzing by reminds me that yesterday three or four of them came out from a certain spot and very politely advised me to move on, and I did. With the exception, perhaps, of ocean life, the most interesting thing about this island is the insects. There is a fly here now, a battle-ship gray trimmed segmentally with black, with red eyes, bordered with gold, and the last segments of his abdomen red. Wasps and bees are quite frequently met with, but the flies are most numerous and of more variety. Butterflies and moths are very scarce, and of but a few plain species, and more noticeable because of their rarity. No aphids that I have noticed, and not many scale insects, except on citrusfruit trees and introduced flowers. Well, here's for another hour or so--let us pray for a short so too--with Lantana! My hands are a bit tender this morning, and progress is decidedly slow.

11 A. M. In a grove of Bamboo and still well above the nearest signs of civilization, with Lantana betwixt and very much between me and there. I crossed the ridge to the right, or north, of the creek hoping for a trail, but no trail was there, only the tall grass Darwin records, and the Lantana he never had the pleasure of meeting here. Tried the next swale but did not find anything better. Started around it to the right, when I noticed that the ridge I had just crossed was well ferned just below my tracks. So returned and made for the ferns.

Having grown tired of the choking straps around my neck and shoulders, I decided to try carrying à la Tahiti, using the gun for a pole. Found it a little cooler, but with this off, I am noticing the mid-day heat already. Found that, by lunging the load ahead of me, I could make fair progress through the ferns. Growing weary, I left the load and walked ahead to the point of the ridge, breaking a trail.

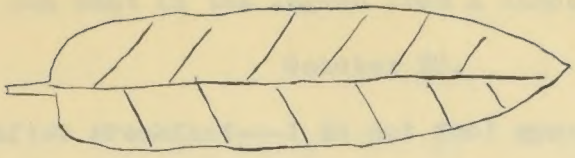
Returned and walked right along with the load, but I lack callouses on my shoulders. Descended almost to the tip of ridge, where Lantana valley on right, and waterfall on left quite made me think the best way would be down into some bamboo on right, but no trail leads out of it. Cool and breezy here, and I am loath to venture into the jungle of thorns ahead of me. Would take more time, only I know the Becks are worrying considerably by this time. Well, with good luck, I'll be able to catch the bus.

Plenty of Mynas wherever Lantana grows. I must examine their crops next time we kill them, for the seeds. A few weaver birds in neighborhood of tall grass. A hawk over head this morning, but would not come near. A bo's'n bird sailed over on his way seaward.

Have slept half an hour, but feel rather indisposed for further efforts, especially if this next patch proves severe. However, I can rest my shoulders under the Tahiti method while working. Feel rather weak, and I believe I could eat something or anything edible.

12:30: Waterfall Creek, and it is trying hard to fall, but makes only small leaps which are easily circumnavigated. My load feels very heavy and I am rather all in, shaking tremulously from exertion without sleep or food sufficient. But I'll indulge down at the store here, on a can of salmon and whatever else looks good,--and anything will look good. Am trying to call Upa while I rest, but with no success. Pineapple bushes here, but no pines, unfortunately; one would taste pretty good, even green.

Lantana was pretty well in command of the gulch center and elsewhere as the trail from Bamboo down here led, but should not bother me much here now, where a well defined, though not recently used, trail goes down the valley. Some splendid trees with large ovate-linear leaves, 35 to 40 cm. long, and 7 to 10 wide.



The tree has a very irregular trunk or bowl, with roots forming odd elevated ridges running out from it. I camped beneath one like them last night.

Waterfall Creek, "Pape topa", it should certainly be named. I stopped at the sixth yesterday, which was large enough to force me to scramble around them. I left it to-day for quite a spell, and, often returning to it, counted six more falls, but the last one was not so bad because roots grew over the ledge, and I let myself down with them. Tried a photograph of it at 1/10 F 4.5. The rest of the journey was just nice stream bed, traveling with three detours around deep pools. Was unsuccessful calling Upa and Ruro.

Now if such things happen much more I'll begin to change my opinion of the Chinese on this island. Certainly no Chinaman was ever more welcome than one at the head of a well cut trail, chopping trees. Nor was ever anything more appreciable than a good big cocoanut I knocked from a tree beside a Chinaman's house. Drank the milk and ate all the meat, leaving 15 centimes in the empty shell at his door. But that delay caused me to just miss the bus. I struck out down the road ready to hunt, when a Chinaman came along with a horse and rig and gave me a short lift,gratis. Afterwards, changed to my tennis shoes, and was just about to go in a store for some grub when an auto came along, and so I rode in on the running board as far as the Beck's.

I found them just on the verge of making inquiries and a search party to-morrow. He agrees with me that the likelihood of rails up there is worth a day or two with a camp near the marshes.

To-morrow I can hunt in the lagoon from a canoe.

October 30.

After breakfast---I do not fool myself with the bit of bread and a cup of coffee as these Islanders do; I eat a man-sized meal of eggs, bread and butter, fruit, and a large glass of water too good to tarnish with the excretions or taint of any burnt berry-- I sallied down to my native friend by the lagoon, and, hiring his canoe for five francs, paddled out to the surf to watch for birds. Of five black-capped ones I bagged but one, and again missed the fellow perched upon the stake. Of three small white,blue-billed ones, I obtained one.

The breakers at the reef were tremendously magnificent today. Even at low-tide they were pouring water more than a foot deep, and seething with a foaming mass over the flat surface of the reef, which is but a few meters wide. I tried holding the canoe against the inner edge, but the rush of the surf was more than I could manage,and, after a good drenching, I retired to the safety of the lagoon. There was a very strong drift away from the reef, which made it rather difficult to keep within range of the black-capped terns, which come hunting fish along the reef; consequently, I missed three of them.

I tried some speed pictures of the waves at $\frac{1}{1000}$,$\frac{1}{295}$ F 4.5, good light. Returning across the lagoon, I bagged one of the blue-billed white terns, marvelously beautiful little birds, often seen hovering above the tree tops, and to-day noticed going back and forth from the lagoon to the tree groves, but not in great numbers.

Much to my disgust, the wind to-day informed me that I was a very poor canoe paddler. Two native boats passed me with twice my speed; they ride high, and the least breeze turns them, if not held with steady and regular paddle strokes.

Photographed the bunch of youngsters who take so much delight in my hunting. It is all so strange to them that people should desire birds for anything except eating. If they knew of the hat feathers, and specimens mounted for club ornaments, and the thousands shot for sport, the American boy and his twenty-two seeking a living target, they would be more surprised than ever. Scientific work is,of course, as strange to them as it is to any children--for mentally and naturally they are merely children--happy and contented just to be alive and left alone.

I do not believe they are the least bit benefitted by our forcing our religion and commercial life, which we call civilization, upon them. They are not like the orientals who have developed their arts and industries, and are intelligent to a high degree, but are undoubtedly mere children of the race. So I believe these natives can be praised into labor, much easier than they can be purchased or hired to work. See how industrious they are over straw hats and trivial things which require patience but not intelligence. Then see how quickly they respond to praise with gifts of their own handiwork.

I promised Mr. C.B. Nordhoff some fern roots for the garden he has started next to the Beck cottage, facing the entrance to the harbor, where he resides. Then I came to my room to read his article in the "Atlantic Monthly", called "On the Lagoon". Hall, author of "Kitchener's Mob", is also here on a writing contract. Evidently the field for articles on the Southern Seas is ripe; will I reap my share of the harvest? It will take a sharp scythe and clever cradling if I do, for competition is not lacking. How interesting to meet such people in these out-of-the-way places! There are three or four types of people here: the transient tourist who stops over for a day, while

the cargo is shifted, or stops a month between boats; a few are here for health; the indolent ne'er-do-well, who likes the laziness of tropical existence and drops back through all the stages of human progress in one lifetime; the business man who finds the native islander more gullible than his native folks; and the students of the arts and sciences, who are endeavoring to further the intellectual advancement of the orthognatheus world by a study of the prognatheus; add to that, seafaring men and there are few others. I should have written letters to N.Z. and Australia, but an "Atlantic Monthly" is a rare treat.

October 31.

November 1.

Struck out to walk to walk to Chinese rice fields beyond Pirae. Rode some distance with a Chinaman. Turned up a lane that had water in drainage ditches on either side of it, and found the rush swamps,where I have added two new birds to our list. Collected, also, one Myna who sillily remained within cartridge shot range. One red-rumped weaver bird, the others all being minus the red-rump, but not yellow. These latter are the most numerous around this Chinaman's place, and hide in the rushes when approached, uttering their light squeaking peep as they flit restlessly from reed to reed. The call is slightly different when they are flying. They have red cheeks.

While hunting them, I noticed a new bird in the rushes and succeeded in getting him. Later, got one of three like him in a tree above rush beds. Have seen no others. It may be the yellow-rumped weaver bird, with black markings, buff under parts, brown back and breast and steel-gray head. Drank juice of three cocoanuts this morning, for I do not approve of drinking water in a creek flowing through Chinese

farms. The rail may and may not be in this swamp; saw no signs of any. It would be necessary to spend an evening here to hear them calling. I have missed many shots this morning, and failed to find a number of birds in the reeds. Ate lunch here in the shade beside the stream, hoping something would show up, but nothing has. Will use either all of my cartridges or all of my time hunting those small birds.

To illustrate the confidence the weaver bird has in its safety while in Lantana brush, I just killed four in one large bush by walking around it. There were still birds in it when I went in after the dead ones. Got two in grass field near road. Have sixteen birds for to-day's bag, and it is but 1:15. Having used my cartridges, I'll return along the lagoon shore and see if I can pick up a tern or heron.

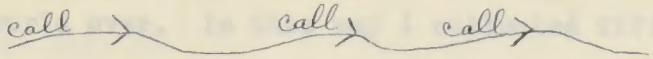
I found nothing until arriving at the canoe native's, where two terns sat on the stakes and were once again missed; next time I'll bring the twelve and get them.

November 2.

By waiting again at the hotel I once more missed the stage to Hapaape, and consequently was obliged to come again to the nearer swamp, just beyond Pirae where I rode most the way, first with a Chinaman, and then with two young lads. At the same field I obtained one more warbler, which we suppose them to be, and four weaver birds, two red-rumped. The birds there getting wild, I came on down to a rice field, where I succeeded in getting two red-rumps; and then five plain, with one #10 large shell at about twenty-five meters. The Chinese owner of this place, a nice fellow, informed me that from 5 to 9, morning and evening, I could get all I wanted. But if we go into the mountains to-morrow, I should be back at Papeete by five. So, unless this day's catch suffices, I shall come early some morning.

The red-rumped and plain weaver-birds have quite a distinct call, the former being more plaintive, the latter perky; while the warbler (?) has a light whistle without the squeakiness of the weaver-bird. Two native boys just stopped and assured me that the warbler also was "Vina".

The warbler, Mr. Beck tells me tonight, answers the description of the yellow-rumped weaver-bird; so the only question is settling the reasons for the difference of plumage of the carmen-jawed. The number of "rumpless" ones yesterday collected were either females or too young to be determined. The question would be most easily settled by proving that the "carmen-rumped" ones are all males. Fortunately today's collection numbers many of them, as well as considerable of the others. This will perhaps explain the reason why those with "carmen rumps" are attracted by calling, while the others pay no attention to it, and rather hide in the depths of Lantana brush. If they are females and young, that would be a very protective trait while his "red-rumped" Highness goes singing about to attract attention. The calls uttered are quite different, the "rumpless" being jerky and more squeaky and uttered while flying in waves or jumping about (flitting) in the brush. The male, if such he proves to be, also calls according to the above wave formula, but it is quite a different and very typical call.



The "yellow rump" I observed but one call, a very weak and pert whistle,--no squeak. He was not attracted closely by my best imitations, but I imagined that I influenced several of them as to the direction of their flight, which often swerved noticeably as I whistled, and several often lit in trees about thirty yards away. It is strange they do not appear to be as alert as their carmen cousin while feeding; hence I was able to get fifteen or so today, showing a good series

from juvenile to old. They frequently line up on the old rice along the ridges which divide the fields, and, by using the large cartridges, I succeeded in bagging 3,5,7, and 16 in four shots. My count had run over forty, where I expected to stop, when I made the last glorious shot.

Of the sixteen, some six or so were yellow rump, and the majority of the rest were rumpless carmens, but two carmen rumps were present. Once I killed a yellow rump a meter out in the rice field. Not liking to lose him, I stopped with one foot out there, just as the owner yelled for me not to do so. Into my knee I sank in the swamp muck, but I got the bird, then pulled myself out and thought no more of it.

Just after I had gathered the sixteen and dropped them without wrapping into the basket----

But I must first tell about my lunch, eating beneath the shade of a mango tree beside a ditch of the rice field, and just inside the fence from the road. Occasionally I succeeded in calling a "carmen rump" into the boughs overhead, and often too close for shooting. Whenever I heard the "yellow rump" I watched to see them alight, and then got up and stalked them. All this to the great amusement of five native boys, who made excellent and ambitious retrievers. A boy is a boy the wide world over. In this way I collected fifteen birds.

After eating, I packed the game away, to the delightful amusement of my circle, who are still at a loss as to why I handle the birds so carefully. I could not teach them to do so as easily as a retrieving (Luellyan) puppy might have been taught. Putting the two packages--I left camera and glasses at home--over the shoulders of my two oldest "hounds", I proceeded, like any proud hunter, to stalk the rice field. What interesting children these natives have! One wore an

undershirt, slightly ragged and belted at the waist and not one millimeter too long. He climbed the Mango tree and brought me down a juicy ripe fruit.

Thus, when I shot the sixteen birds and we had collected them, I was conversing by signs and pantomime with my pack, when the noise of a truck coming up the road started action. It was four o'clock. Unceremoniously, I grabbed the two bags and slung them on my shoulder, spilling a dozen birds. But ten hands soon replaced them, and I was off through a nearby cow-pasture to hail the truck. What a pleasure when it slowed up, and what a relief to climb aboard and be hustled to Papeete. They turned north at Fantana, and dropped three ladies near my canoe-native. So I descended and went there in hopes of picking up a tern or heron, but none came near while I wrapped a-way the thirty and more birds, after feeding two spoiled ones to a cat--hope it does spoil his appetite.

At the hotel, while in the shower bath, I first noticed a slight swelling and pain in front of my left hip joint. What is it? Did I wrench that joint while pulling the opposite leg out of the miry muck of the rice bed? To-night it not only is swollen worse, but has me limping considerably, and, while I poured iodine on it, it put me to sleep. Mr. Beck is now about, and it is strange that I should get laid up.

November 3.

Felt much better this morning, and so took to the field at Hapagse, whence I rode via a lift and then the stage. Did not locate any particularly good swamp for ducks and rail; nor did I get anything at all during the morning. Missed Larapapa four or five times, and flushed the blue heron always out of range. Once flushed

one while stalking tatlers, and never saw him until beyond reach. White terns always just beyond range also. Coming over the 8 km. grade, I stopped for lunch and took a short nap. Had not felt much like work all day, but leg seems to move fairly well.

In the afternoon at the Chinese rice field, I picked up one yellow-rumped weaver with a flock shot #10. Later killed a quarrelsome Myna. Then succeeded in stalking within cartridge range three tatlers and one golden plover. At the mouth of Fantana the Catholic priest and teachers were with several Tahitian boys. While talking to one of the teachers, Larapapa came overhead. At the eager calling of the boys, I timed and fired--a much longer shot than all previous ones this day, and,fortunately and much to the delight of the audience, Larapapa ceased his rapid flight and came down to earth. He was retrieved by the lads, and it greatly amused them the way I so carefully wrapped him up.

I left out a paragraph about Larapapa. At Point Venus, five of them sat calmly upon the branches of a tree stranded out in the lagoon. I helped myself to a canoe and paddled out; had plenty of opportunity to creep up closer to them, and, as three were somewhat in line, I should have bagged at least one the first shot, and another as they raised. But missing the line-up, I let them all depart unharmed.

At five o'clock by the shipyard, I again borrowed a canoe, and this time paddled quite close up to two sitting on nearby stakes. Shot the nearest, and, as he fell, the other came over to see what ailed him, and I got the second one too. That ended the day's hunting fairly well, but made me late at the hotel. There the showers being busy detained me fifteen minutes more for dinner, when we had company.

November 4.

Purchased new pair of rope-soled shoes. Manu and I came out at 8 o'clock to Pirae, and are now ready for hills and Noha. The trail leads through a sugar plantation, so I start the journey chewing cane and sucking the juice. We have abruptly ascended the ridge west of Pirae, and are now up in the fern-belt, where barren red clayey soil prevails with heat and sunshine aplenty. We sleep to-night on this ridge where we can hear Noha.

In the scanty shade of a small tree, about 500 feet elevation. How thoughtless to forget the Aneroid last night! For it now appears that this will be the best mountaineering expedition yet. For a belt, Tuaurae has a significant rope. May we to-morrow locate Noha! Am not shooting to-day because birds would spoil before we return. Mouti is crowing.

First shady dell on the side of Fantana Valley. What a wonderful sight a native laden with golden and juicy oranges is! Ungrateful wretch that I am, I forgot to photograph him, after he pulled four oranges from his load and handed them to me and refused pay. How delicious, how palatable, and how refreshing they were, for we were then at the hardest part of our climb,--the upper regions of the dry fern zone. But another came along, laden with Feis and a few oranges, and I had the camera out before he reached us. The next event of note was the wasps, one of which introduced himself rather emphatically to me. In fact, he stepped right in and presumed to seat himself upon my right hand, though he landed on my elbow. We are making fairly good headway, and I hope reach Noha's haunts for the night's camp.

Beneath the clouds and in the upper wet belt, where Upa answers my calls, and Ruro calls of his own accord. It saves time

not to be able to shoot, and, consequently, we should get to a pretty good elevation by evening. I would like to camp as near the Noha colony as possible, and perhaps be able to shoot some by campfire light. If we could spend most of to-morrow digging,and make an early trip back Saturday, Mr. Beck could get the skinning done before Sunday, and not have to work that day.

At the first orange tree beside the little creek leading down to East Fantana--I think the one entering at the waterfall where I spoiled a picture by double exposing--we stopped for refreshments, and then ate lunch. I gave Tuaurae the working man's portion of bread and meat, and left the tin of marmalade where he could reach it,--but he never touched it. Five oranges here starts the day out, with ten before noon. We will certainly have some feast these two days and Saturday morning. Feis are present, even here.

After a steep climb, we reached an orange tree, where the natives whom I photographed at our lunching place had left a dozen on the ground. So handy were refreshments that we stopped and indulged, adding four to to-day's total. After a few more of these trips, I will be well prepared to write an article on mountaineers of Tahiti, for certainly these men are the champions of tropical mountaineers. Perhaps a glacier or the Matterhorn would stump them because no vines or roots grow there, on which they could hang their lives' dependence.

After another very steep climb up the head of a ravine filled with Feis and the slippery mud so characteristic of them, we reached the summit of a ridge, whence we appear to drop down a bit into next ravine, into which the dog had preceded us, and routed a pig. I went down in, but,not being certain of the trail out, I waited for guidance. Had chosen the correct spot, strangely enough, which led to a really steep hillside, up which we are now struggling. Tree ferns are here in

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abundance; also the fog which hides from view all scenery below us, and is very delusive about that above.

First knob at head of that ascent. It was about as steep as clay soil can possibly be without sliding,--very little less than 45°. Tuaurae says we will reach Noha to-night. May we not be disappointed! What a victory it would be to go in early Saturday with thirty birds and several settings of eggs! Or just to find a dozen birds will be quite satisfying, and make me feel that I have earned my salt these three days. Myna calls from the ravines below, and Mouti crows farther down.

Foggy, but quite warm here, and almost sultry. There is a brilliantly red compositae out in blossom quite abundantly here. Upa is calling. There is also the shrub that bears the Hachea-like blossom. The pounding surf along the reef sends a continuous, though fluctuating, roar up through the fog below us. Once the sun tried in vain to break through. I hope it clears away for the sunset, so that I can locate myself by the shadowy profile of the Man of the Mountains. Not having the barometer, I might take observations on it from two points along the coast, and so estimate its height in comparison, at least, with the summit of Aaorhi.

I forgot in its proper place, just after lunch, to mention that we met a Vahina with a sack of oranges over her sturdy shoulders, bare-legged, with a light dress reaching to her knees. She seemed quite backward, and somewhat frightened at first, looking back towards her protector, no doubt. (With her were two dogs.) The man came along later with oranges, very neatly tied in bundles, and cleverly fastened to his pole. A little beyond, a third dog appeared, and then two mountaineers in the making. They were two lads, not more than twelve, each

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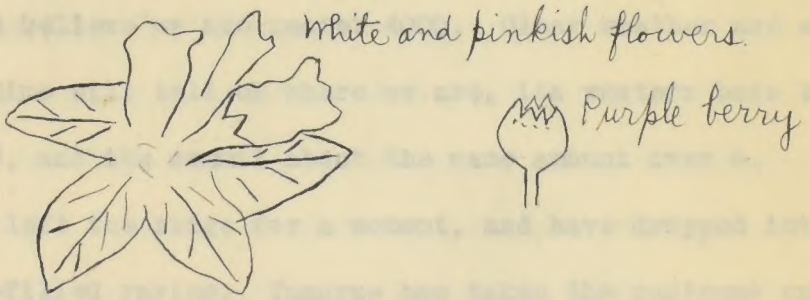
carrying good healthy-sized loads of oranges. I hope it was not too dark there for the picture I tried.

We have ascended two or three more knobs,-- the ridge being best described as a succession of steep inclines in knob summits, with but very little drop before the next incline, the slopes being very little, if any, under 45°, and making good stiff climbing.

Fog more dense than ever. Only the two adjoining knobs are visible.

Tuaurae is a sturdy native, well along in years. He has more hair over the back of his shoulders than any Tahitian I have yet seen, but not so much as some of our northern Europe types, nor many of that self-styled chosen race of God, the Hebrews, whom I believe as a race show more hairy relations to the apes than any others; while of course, this prognathous people hold the cranial record.

Motuu.



Resembles service berry in taste and looks. Grows along high ridges above tree fern belt.

We climbed one knob by working our way around its side through a splendid fern garden, and then made a short dip along a veritable knife edge, and ascended the steepest slope yet encountered, where, by that sheer bull strength, Tuaurae is elevating our equipment to this new altitude. (How I miss that barometer!) That we are well over two thousand feet I haven't the slightest doubts. If the fog would only clear away and let me make comparisons; but very likely it will stick around until it develops a good steady rain storm, for they seem in-

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evitable when I strike mountainward. Our dog is a decided benefit in nosing out the trail from the entanglement of ferns and brush it frequently develops into. There is a decided advantage for a dog with the outfit, let alone the retrieving one could be taught to do from water, and finding birds dropped into the brush. Tuaurae says, "Noha fatateta"--and answered, "Yes", when I asked if it would take one more hour. He is enjoying Motuu, and I ought to be.

We have ascended along that very conspicuous knife-edged ridge descending from Aorhi on the west, which forms the shadow at sunset, which makes a splendid silhouette of a man. I do not believe we are yet as high as that particular place, though certainly we are up in the air considerably. What was I thinking of to leave that barometer behind? Having had fog the past few hours, I can make no accurate estimate of our altitude, but I feel certain that we are more than 3000 feet, and believe we are nearer 4000. Clear weather and a glimpse of the Diadime will tell us where we are, its western base being slightly over 3, and its summit about the same amount over 4.

We have left the ridge for a moment, and have dropped into the head of a fern-filled ravine. Tuaurae has taken the canteens and gone for water, there being none where we camp to-night to listen to Noha as he comes in from a day's fishing at sea, and leaves early in the morning.

It is now five o'clock, and it will very likely be six before we camp, but we have canvas for shelter, and two blankets, which, with a bed of ferns and dry clothing, should keep us comfortable for the night. My one worry is that there will not be good light-giving wood and plenty of it, so I can keep awake to-night. Back along the ridge we flushed a hawk, Amumoa, but, as I had the gun in its case, he sailed away, undisturbed.

I wish I knew just which kinds of ferns Nordhoff has, because, unless I overload Tuaurae with birds, I can easily carry down a few growing root tips. This little dell of ferns,-- nine tenths of the vegetation here belonging to that subkingdom-- is densely overgrown and very picturesque. From the noble tree ferns, down to the delicate maiden-hair, they range. Mosses too are plentiful, and one variety covering the lower portions of the tree fern trunks is more than six inches long.

Tuaurae returns with jingling canteens giving a full ring.

In camp next morning: Following our advent from the Ferndale, we slipped over the ridge and started around the Pirae face of the slope, where our trail soon disappeared, and the goat trail,--the dog had some located a short distance ahead of us, and was baying "Treed",--was anything but satisfactory in direction and brushiness. I hacked our way through until Tuaurae finally ordered me to remain with the stuff while he scrambled on ahead to find a camping place. Soon I heard him somewhat above me returning. I attempted to carry the load, which I might have done a short ways on good level ground, but here it was impossible for me to make any headway under it. We scrambled along the slope in the utter darkness quite a ways, when the idea of paper torches came to me. Lighting one, Tuaurae, instead of proceeding, commenced to gather twigs and sticks for a fire, by the light of which we finally hacked a way ahead, and built another fire which guided us to the Feis patch where he had decided to camp. Feis leaves, once started, burned well, but being slightly moist, were difficult to start. We built a large fire and spread dead leaves to lie upon, then returned for our camping material. We found the second fire embers still glowing slightly, but Tuaurae struck a little too high thence, and we missed the stuff. Stopped at what we knew to be

about the proper distance, and built a fire, upon which dry fern-leaf stalks gave a good light, and by their aid we found the load a little below us. Returned easily by the guidance of half a dozen paper torches, and at nine o'clock made camp, weary and tired and ready for dinner. Boiled eggs, a can of meat, and bread and marmalade, of which Tuaurae this time partook, tasted gratifying, to say the least. But there was another disappointment for us, and Tuaurae seemed affected by it.

While I had been waiting behind with the things, I had heard,in the distance, the same calling we heard from the cliffs behind our first camp on the Punaruu plateau, and Tuaurae called it Noha. Since then we have not heard the call at all, and he is worried. I am doubtful as to our success to-day, but let us hope and climb, and perhaps all will be well.

Slept well, but awoke several times during the night and listened in vain for calls of Noha.

BOOK V

Tahiti

Pirae--Aorhi

Nov. 5--Nov. 14, 1920

Nov. 5

Feis patch camp: Dry feis leaves make a very comfortable mattress. We awoke early and listened in vain for Noha. Up at 5:30 and getting ready to search for the delusive shearwaters. May we meet with success!

Breakfast consisted of a can of boiled beef, three potatoes and two onions fried in bacon grease, bread and butter, sugar and Feis. The Tahitian is a heavy eater, especially when working in the mountains,--and when in the mountains they certainly work. They refuse to put salt or butter upon their Feis, chewing them thoroughly and at length. Consequently, we Americans are always finished long before our guides, who chew Feis several minutes after we are done. The time taken by the Feis for both preparation and comsumption is considerable. Well, we have some baked now which I can use to get dinner with. The water supply is going to be short or require climbing from here.

Before I start to pack things away I must make a note on the flies. Mrs. Yerex said there were none, which must mean they

are well protected by spiders and wasps. Up here over camp this morning is a hum with them buzzing about and getting into everything.

NOHA! After leaving camp we proceeded along a trail leading across the slope on which we camped. A sharp ravine, fern-grown, cut the slope and held a small stream of cool water. We here had our morning wash and drank our fill, also filling our canteens. Proceeding farther we ascended a ridge to a point where Tuaurae said, "Noha". We have been searching more than an hour, but have found nothing except old holes, from one of which I collected feathers. It seems the birds favor these ridge-like prominences on bold slopes, from which, no doubt, they can take to the wing fairly easily. The old nests found here were dug beneath the protection of large tree root stumps. Tuaurae dug into one, but there being no fresh signs, I saw no need for further effort, especially after failing to hear them last night. We were close enough to this place to have heard them easily. Apparently they are not here,--but why? Is it the wrong season? Or has this colony given up its nesting site?

For a few moments this morning the lower stretches of hills and the lagoon could be seen. Pirae is a deep and magnificent valley, being well timbered down its slopes and only the bottom being precipitous. The whole is now enveloped in fog which has a highly diffused light and is very bright and glaring,--almost as bad as snow.

From where we are, one looks down at an angle of 45° and sees the slope end, while the white fog seems to come back underneath the visible earth. It gives the impression that the little

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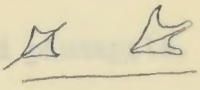
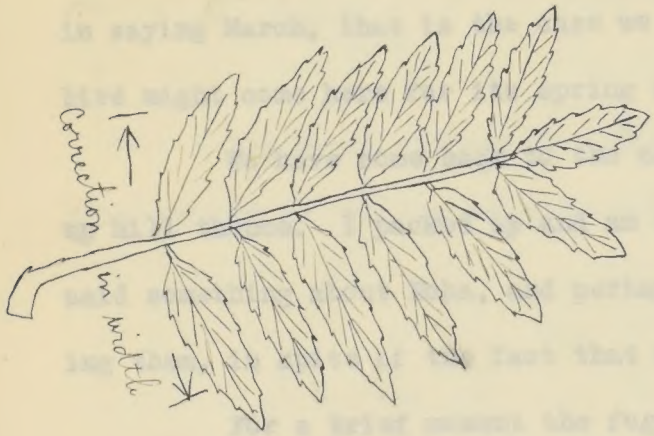
From where we are, one looks down at an angle of 45° and sees the slope end, while the white fog seems to come back mysteriously the visible earth. It gives the impression that the little

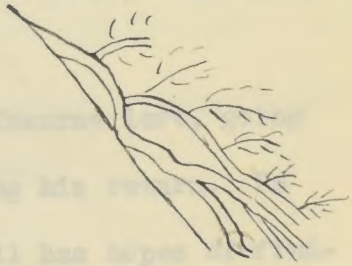
slope you are on is suspended high in the atmosphere. If it were a clear day, I should be sorely tempted to ascend Aaorhi. Somewhere in this mountainous region there are shearwater nests, but not at this particular spot.

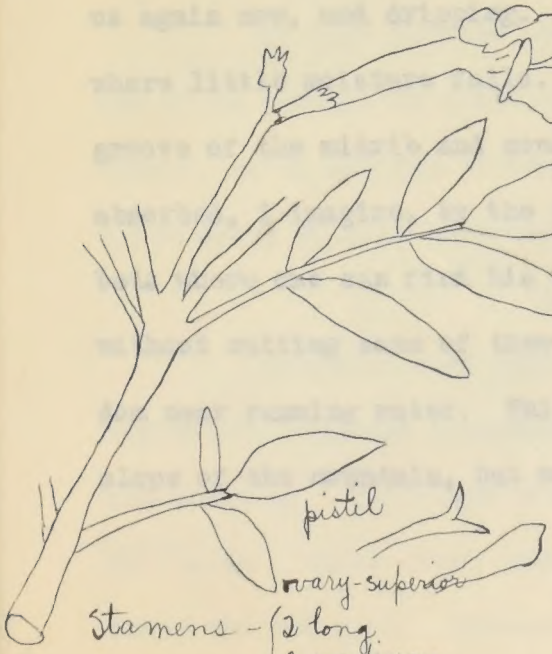
Young Noha. 

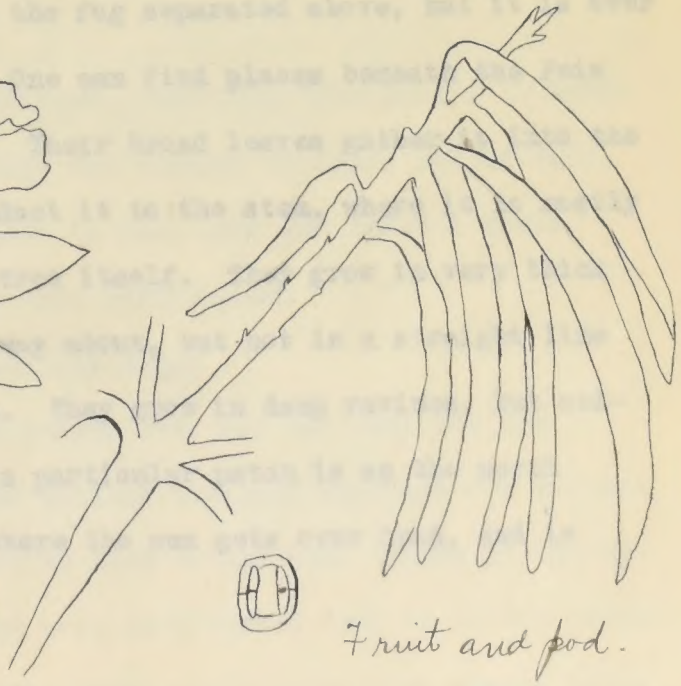
"March".

A very common tree in these mountains possessing a soft wood, smooth easily peeled bark on saplings, and rough slightly ridged bark on older trunks. The growth of the tree is peculiar, it seeming to give in more to geotropiem than heliotropiem. It forms rather close growths, but usually can be crawled through.









Tuaurae has returned from his likewise unsuccessful hunt, and assures me that Noha is plentiful in March when eggs and young are present. Guess we will go back to oranges, and hunt Upa.

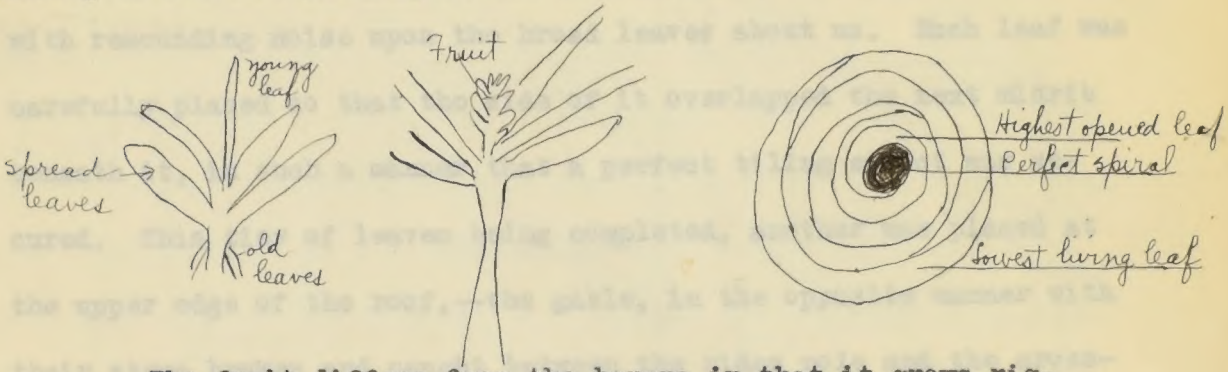
We stopped at the little stream and ate our lunch of bread, jam, boiled beef, and eggs, with a splendid pineapple. I gathered some very interesting small ferns from beneath the banks of the ravine. How interesting it is going to be if we discover that the shearwaters nest on this island, both in the fall and spring of the year! One would naturally expect southern hemisphere birds to be nesting at present. If those collectors found them between the Puneroo and Matahia in October, and this man is correct in saying March, that is the case we have. Of course, a northern bird might come here for its spring nesting.

We have come back to the camp, and Tuaurae left, going up hill thence. I packed up and am now waiting his return. He said something about Noha, and perhaps he still has hopes of finding them, in spite of the fact that we did not hear any last night.

For a brief moment the fog separated above, but it is over us again now, and dripping. One can find places beneath the Feis where little moisture falls. Their broad leaves gather it into the groove of the midrib and conduct it to the stem, where it is mostly absorbed, I imagine, by the tree itself. They grow in very thick beds where one can find his way about, but not in a straight line without cutting some of them. They grow in damp ravines, but seldom near running water. This particular patch is on the north slope of the mountain, but where the sun gets over head, and is

rather high all the year round, slope exposure would not be so noticeable in that respect. In regards to the trade-winds and moisture there would likely be a difference.

The growing leaf of the Feis is particularly interesting, in that it is perfectly circular, one half being rolled from the outside inwardly and situated within the groove of the main-rib, the other half being rolled around the outside of the rib and commencing to unroll naturally at the wide middle of the leaf.



The fruit differs from the banana in that it grows rigidly upright at the top and does not droop over.

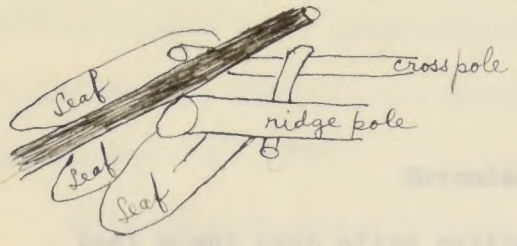
At 3:20 Tuaurae returned, reporting "Ite Noha". I asked him if he thought we could make the Oranges tonight, but he said, "Mero", so we decided to remain in this camp and build a house. A few drops of rain hastened that performance.

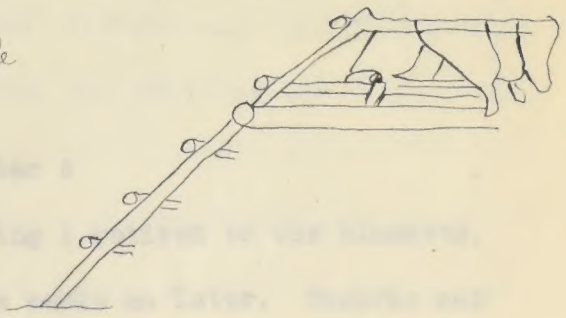
The Feis House

I spread some Feis leaves over our bed spot and the equipment. Tuaurae commenced cutting straight saplings for rafters and sheeting. The ridge pole he tied to two Feis trunks on the uphill side. Three stout poles were then rested from it to the ground below the bed spot. Crosswise, three small poles were placed below

The fruit differs from the banana in that it grows rigidly upright at the top and does not droop over.

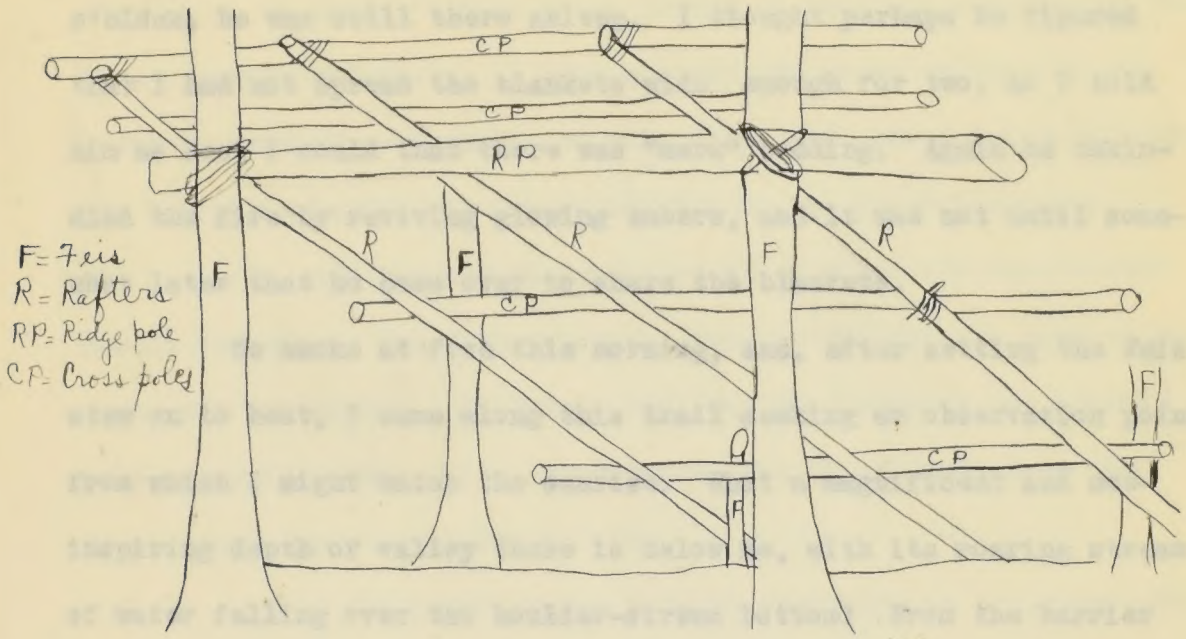
the ridge pole, these being held in place in four instances by small Feis trunks on either side the house. The two other ends were tied with fibre quickly obtained by stripping the leaf from a midrib, breaking the small end and ripping off the fibre along which the leaf is attached to the midrib. Then several Feis were cut down, and the younger, and therefore less thread bare, leaves were laid stem downward along the lower side of the house, with the hollow of the midrib upward to catch and drain off the "Ua", which still "Topa" with resounding noise upon the broad leaves about us. Each leaf was carefully placed so that the side of it overlapped the next midrib beneath it, in such a manner that a perfect tiling effect was secured. This tier of leaves being completed, another was placed at the upper edge of the roof,--the gable, in the opposite manner with their stems broken and caught between the ridge pole and the cross-pole above it. This tier overlapping the lower tier makes the drainage perfect. But a finish is added in the form of a short slope from the apex of the gable down in front of the house. At the upper extremity of the rafters is placed the fifth cross-pole, and over it the third tier of broad leaves is placed, after being broken in the proper place to leave about two feet of eaves.





This house was conceived and erected in less than half an hour by the watch. With a light sweater to put on, one's only thought for fire is to cook food by, and at night for light.

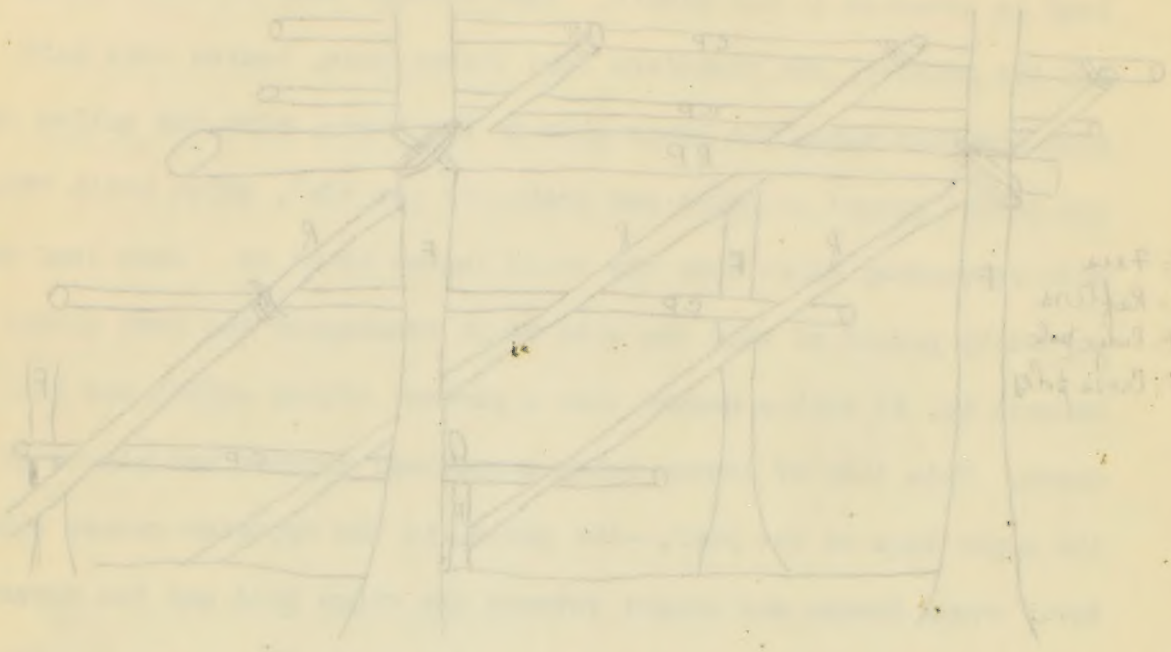
Framework of Feis House à la Tahiti



Feis house, Feis to eat, and Feis to sleep upon! About 7:30 we heard one disconcerting "Noha". What does that mean? The call was a whistle, followed by a weak "meah". There was apparently but one bird calling. I understood they nested in colonies. Is it possible that a young bird would frequent his old home during the season when not nesting? Why only one to be heard? That one was close by, but the sound might have been delusive. To find that one bird to-morrow would be the greatest pleasure I at present can think of.

November 6

Last night soon after eating I retired to the blankets, and soon dropped off to sleep. Noha awoke me later. Tuaurae sat up beside the fire, apparently drying his clothes. When next I



awoke, I heard him off in the grove gathering old Feis leaves. Returning, he moved the glowing coals a short ways, and over the warmed earth of the former fire-place he spread the leaves he had gathered. There he stretched himself, and when next I awoke, at one o'clock, he was still there asleep. I thought perhaps he figured that I had not spread the blankets wide enough for two, so I told him as best I could that there was "mera" bedding. Again he rekindled the fire by reviving glowing embers, and it was not until somewhat later that he came over to share the blankets.

We awoke at five this morning, and, after setting the Feis stew on to heat, I came along this trail seeking an observation point from which I might watch the sunrise. What a magnificent and awe-inspiring depth of valley there is below me, with its roaring stream of water falling over the boulder-strewn bottom! From the barrier reef comes the periodical roll of the breaking billows. Flies hum about, and somewhere a few Myna birds are awake and chattering, but all else is stillness. Occasionally the silence is broken by the mad rush and reverberating thuds of falling rocks hastening to the bottom of the gorge. This steep slope is heavily clothed with ferns and the yellow-flowered, drooping fruited, bi-parted leaved tree.

Clouds are going to prevent anything beautiful in the sunrise, and so I'm returning to breakfast. Then for a short trial for Noha before retreating so ignominously without any sign of any kind of a bird. Perhaps March is the month, but what was our visitor doing last night?

So, having finished breakfast upon Feis stew with gravy, boiled beef heated, bread, butter, and sugar, we went up this ridge to where Tuaurae yesterday afternoon amused himself by attempting to dig out Noha. As nearly as I could determine, he had seen tracks.

But the numerous nests beneath the tree roots here show no recent signs whatever. Consequently, I am still at a loss to account for our last night's visitor. Had he been accompanied by others, I might be inclined to believe there were a few around here. But if there are, we couldn't find them, though we saw this morning, at the least, twenty old nests. I photographed the Pirae valley and the ridge we were on yesterday. We will visit this place again in March, and I hope it is thickly inhabited then by the sea-faring Noha.

So ends our second excursion after Noha, the shearwater! Now to retreat to the Orange groves, and try for Upa and Ruro to appease our conscience. If people realized what expense and trouble some scientific work costs, they would more fully appreciate the final facts, when presented to them.

Along the trail, where we have succeeded in following the proper one, and where we had not branched off, night before last. The fog has not yet obliterated all the scenic canyon below, and across from us is a deep-set cirque, with its steeply sloping walls rising from the river bed to the high ridge above at least two thousand feet, all of the one slope which approaches the vertical nearer than 45°. Here is a gorge as deep, or deeper, than the Grand Canyon of the Yellowstone, although it is not so long, and of course, has but the one green color of foliage, darkened by shadows and a few glimpses of rock. Surely the searcher for Noha is a fortunate man, for to him will be revealed all the most marvelous scenery of the mountainous islands. Brilliantly reflective masses of fog now obscure portions of that opposite wall. How interesting is the drift of the clouds, both when as near as these, and also far away!

Lichens, liverworts, mosses, ferns, and flowering plants; flies, butterflies, moths, wasps, and lowly ants; spiders, centipedes, and crawling worms: few are the beasts of the field, and scarce are the birds of the air, but some object of interest is everywhere.

At the Orange grove we have stopped for lunch, to be topped off with the delicious fruit. Soon after reaching the knife-edged ridge, the fog settled down upon us, and then rain commenced, but a trip into the Tahiti mountains would not be complete without one good shower. It has rained ever since, and shows no signs of abating. The guide is smoking, which he does quite often. Those who smoke claim that its chief charm is consolation. Well, I notice that they always smoke when they have nothing else to do. Give one an idle day, and he will burn up ten times as much tobacco. How much better it is to always have on hand a book to write in! One might as well be recording the process of his thoughts as smoking, even if he burns them up afterwards; the mere fact that he writes them out shows that they are complete ideas. I am no sticker for diaries kept systematically,--they usually are very boring,--but a written record of any man's ideas is always worth investigation, at least.

Through the Feis gardens the mud is extremely slippery and the slope is usually steep. I notice these natives, with their bare feet, are much better equipped for such going than shod people. Only once did I see Tafai slip during twelve days. Once today, Tuaurae did slip a little, but quickly caught his balance and saved himself a fall. Going barefooted has taught them the full advantage of their toes. These rope soles I am wearing are without heels, and

although they make my ankles and arches somewhat tired, I believe they are preferable to heeled boots. If they only would last!

3:45 P. M. At the bottom of the trail, where six men and two boys are assembled with the oranges they have brought down from the mountain for to-morrow's market. And to think that I used my last film up the trail! There is one fellow, at least, behind us. Just counted the oranges on one pole to the extent of 160, which appears to be an average load; though I believe some here have over 200, which is a very good load. The lads brought 80 each, and they are but twelve years old. The men range up to gray hairs, perhaps fifty years. They were very greatly amused in the mountains by my yodeling, and commented upon it just now, with an imitation which was very clever.

We stopped for lunch just above where they were gathering the fruit. Some people call them lazy, saying that all they have to do is take a day into the hills to get enough to live on a week. Well, who can blame them? Who would not rather spend a day in these mountains than at any job in Papeete, or on these white and Chinese plantations?

I tackled carrying everything to Papeete on a pole, but found, again, that I have not Tahitian shoulders. Got to a bridge where I rested until a Chinaman gave me a ride in a donkey soup cart. Slow, but better than walking with the load! A shower went well, and I spent the hour cleaning up. It amused the girls to see me carrying my things à la Tahiti. Put the ferns in shade and wet them for Nordhoff. Heard election returns from America; it doesn't seem that late in the year at all. Glad to hear of Hoover in the cabinet; he'll be the next President.

November 7

"Maara": Have spent the Sunday at this delightfully homelike place. Those first missionaries of the South Sea Islands, who settled here in seventeen hundred seventy something, certainly had an eye for location. A comfortably cool place set decently back from the roadway, with a broad lot and mango trees in front.

Ruro is hereabouts plentifully, with Myna over-abundant, and a fair amount of red-rumped weaver birds. Mable saw a duck near here, and they report a strange call in the valley, unless it be "Upa". Have planned hunting southward tomorrow until stage time, and then back here for the night. Tuesday in opposite direction, and Punaruu-wards Wednesday, going up that river gorge Thursday, Friday, and Saturday. May not only luck, but good common judgment be with me this week, that I may gather many birds for Mr. Beck to skin!

November 8

Went out in canoe this morning, and upon the point were three Larapapa, but did not shoot them, trying to get a shot at a heron. Later, missed little white tern twice. Then thought two birds were herons in deep water, but they were ducks, and flew at a distance too great to reach. Shot twice at them,--missed! Later, missed a black tern twice.

After a swim by myself, we went in to coffee. Took to the field at eight, and about one kilometer along the coast on the point behind Papeari, I found the black tern nesting in considerable numbers. Succeeded in getting eight, but foolishly would shoot while on the wing, and missed two-thirds of my shots. Tried the little cartridges, but it is only a waste to use them upon birds

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this size. Well, Mr. Beck will have something to do today, and, if shells come out on stage to-morrow, I can come right out here and get as many as he wants, I think; so will go and send these in, and an order for shells without fail.

The black tern nests in the cocoanut trees, building well in amongst the cluster of nuts. I would estimate this colony as being well over fifty in number. I think the natives dislike my shooting them because they fish where they see the terns fishing, and consequently, have considerable respect, or even reverence, for the bird.

- Returning by trail to the road, I heard a green dove, and succeeded in calling it within wounding range. Carried it alive to Maara, but they do not care to raise it in captivity.

Intending to hunt up the valley in the afternoon, where the small cartridges would be sufficient, I asked the girls to go along, but Keelah was unable to get away from her housework. Mable, however, went, and proved to be a splendid hiker, a good hunter, and a very enthusiastic admirer of scenery. We were unable to call the green doves, a few of which we heard. Succeeded in getting four kingfishers, but missed the nearest and easiest shot. Mable's shoe breaking along the seam, I made her put on my tennis shoe, while I tried traveling barefooted, and suceeded marvelously well. Returning, I even took off the other tennis shoe, but it was not quite so easy then. We reached the lowest growth of Feis, Opui, and the liliaceous Fari plant, but turned back before reaching the slide pool, a place where the creek slips over rocks into a deep clear pool in a small gorge.

Had a splendid dinner on chicken, baked papiroes, and other tropical foods. While we were finishing the meal, four of the Pitcairn Islanders came over to visit. Fifteen of them came here on a schooner, and, not liking the ship life, they have gone to work on plantations here. They contracted to clear some land for one Charlie Brown, who made a good bargain, for it is covered with bamboo, and the Pitcairn boys thought a hectare about equalled an acre.

We had a very interesting evening's conversation with them. How interesting it will be to study the lives and thoughts and conditions of these people who have all their worldly wants provided by tropical nature; where money is almost unknown, and quarrels seldom occur; where everyone helps to keep his brother, and selfishness is a negligible quality. They talk very easy going and unemotionally, have a little pride in their native home, and boast a bit, but show no bitter patriotism. The most interesting remark they made was, "There is no need of getting married; you have your mother and sisters to cook for you." Birds, they say, are plentiful enough, and different from others. I am anxious to get at them.

I forgot to mention that I broke in a colt to ride bareback, much to the delight of these hospitable people.

November 9

Crept cautiously through wet weeds and reeds to the point where yesterday I flushed the two ducks, to find only a blue heron, too distant for shooting. Upon looking around, I saw four ducks out in the lagoon. I have taken up a position in the tall grass near shore, and am trying to call them in near enough for murder.

Just got an answer from down the shore. This is not such bad duck territory. My one fear is that they will not come in by the time I have to go for coffee.

My ducks will not respond to the quacking of my voice. Perhaps the best thing will be to sit here in the wet and cool grass, as many a duck hunter who desired game nowheres nearly so anxiously as I desire one brace of these birds has often done, and wait patiently for them to come ashore to feed.

"Quack! Quack!"---I grabbed the gun, and turned to see two large ducks fly swiftly behind me. I "quacked", and they turned, and came back squarely in front of me. I thought of waiting until they passed, for fear of tearing up their breasts; but when they commenced to swerve, I aimed, fired, and missed; missed a second shot also. The four smaller variety of ducks, out on the lagoon, raised and departed. A heron lit in the tree nearby, and I took a shot at him fifty yards away,--foolish! Then a gendarme beckoned me from the road, and I had left my permit at the house.

After breakfast, he called to see the permits, and all went lovely. It seems that he also found three of Mr. Yerex's horses in the road,--a law that needs introduction into America, but of course the police should not get half the fines, as he does here.

After getting a supply of shells, I went bare-footed to that point beyond next creek where the black tern colony is, and in half an hour and fifteen shots,--four-fifths on the wing,--obtained twelve specimens, which fills out that series. The native, near whose house I killed the birds, took the gun, while I wrapped them up, and killed one more out of three shots.

The sun hits my feet and head like a shower of hot metal.

The mail came along and took the box, and then I struck out to hunt, with a pack of native lads at my back. At the Chinaman's store, where I lunched, assembled no less than eighteen children under twelve, and a few in their teens, with a few grown folks. Buying a can of salmon and a drinking cocoanut, which one of the older natives brought me, I sat down upon the porch of the store and proceeded to entertain the crowd, at the same time satisfying my hunger. Was quite successful in both attempts. What with flies and dogs and cats and a few foolish antics, I kept the crowd roaring most of the time. So when I started out in the afternoon, I had a regular pack of them at my heels. They guided me out to a point where I found a flock of Larapapa sitting upon old tree trunks and branches lying on the beach. I crept up within long range, then crawled to medium, and then to short range, and with five or six lined up on a log. But I did not have the nerve to pull both triggers, and my one shot dropped but the first bird, and wounded very slightly the second. With about six shots, I dropped two more birds from the air.

Spent evening searching for Myna nests, and photographing weaverbird's nest in coffee tree. The wandering tatler, "Toreo", is here along the beach quite frequently met with, and very occasionally the golden plover. A few white terns hover high over the tree tops, the black tern nesting in cocoanut and "Maupa" nut trees near Papeari; larapapa being found in a flock of more than one dozen. The blue beach heron present frequently. Upa and Ruro both are found in the trees bordering the lagoon. Myna and weaver bird as overly abundant as everywhere. Mosquitoes are very thick and bothersome this night. We had dinner half an hour early at Vera's urgence, and made an excursion after papiroes, which grow down beyond the swamp. It was a

little too dark but Vera succeeded in getting a few ripe ones. Just as we returned, two of the Pitcairn Islanders arrived. Consequently, the evening was devoted to further information of that unique island, interspersed with a few exhibitions of muscular strength upon their part, in which, of course, I bore no share myself, nor had I anything to offer along the line of sleight of hand that Mr. Yerex exhibited. Rain tonight may defer the Punaruu trip.

November 10

There were no ducks this morning, so I started down the beach missing terns and herons. Have missed four of five shots, young Turapapa being the only victim. Flushed a green heron, Au, but failed miserably at a very close range to hit him. White terns present, and I succeeded in bagging one, also a kingfisher on a tree next the beach. Returned for coffee, and then packed everything for stage to Punaruu. Went out and got three black-capped terns before lunch. Rainy weather may defer me from attempting the Punaruu canyon.

Perhaps the Pitcairn people have not the advantages of modern civilization, but if they have eliminated selfishness,--and these boys claim they have,--certainly they have made one important step towards paradise where paradise must be sought upon this earth.

BOOK VI

Tahiti

Papenoo

Nov. 15--Dec. 5, 1920

November 15

Mrs. Beck reports that Mr. Beck went to the doctor today and had considerable dead tissue cut away from around his sore heel. That was the first time he had been to see a doctor in fifty-two years. If my knee heals no sooner I will not only know a little about ornithology, but also something of the Tahitian language, which I neglected yesterday.

November 17

For the first time in my life I have seen male mosquitoes flying about. Generally they are only seen when raised from larva in the laboratory. Here they are quite numerous about the netting of my bed, perhaps bent upon their family duties, but not bothering the few females about that I have observed. They frequently light upon my feet and I have waited motionless for several minutes at a time, hoping in vain that one with the large patinellate antennae would bite me, that I might record something new to science. But they are perfectly contented to cock their hind legs into the air and stand there like dotards.

ROOK VI

Tahiti

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November 18

November 19

My knee feels much better.

November 20

Got up and dressed, eating in dining room. "Marama" arrived at 4 P. M.

November 23

Mr. Beck is still laid up. He does not want to do any skinning himself, so I will go out mornings, and practive skinning birds in afternoons.

Out in the yard is a native in a blanket, crouched low down and crossing the light from my window in a very mysterious and spooky manner. Is it play or devilment? He crouched behind a tree, then went on towards the kitchen door. I threw a mango, but not intending to hit him, and so missed. Probably just one of the help on a prank. Just as long as it is not a Chinaman, I should worry! Went around to kitchen and outside there he dodged under house. Ninai in kitchen seemed not to be worried, so guess it's just one of the boys alright. But why the foolish antics? He is walking around now plenty bold enough. Well, nothing much ever happens in this dull place. No wonder that everyone takes to drinking and dark women for excitement. People without science to interest them probably find life here rather boresome. "What good does science do?" they will ask. Well, it at least gives a man something to utilize his energies upon besides the mere common occupation of business and the relaxation of pleasure.

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Nov. 24--26

Took to the field Wednesday morning, with my good man, Friday, carrying all equipment. We were fairly successful getting Reef heron, Tarapapa and Mynas sufficient to keep me busy during the afternoon, and Thursday until noon. Went out Thursday afternoon and obtained another heron and some wandering tatlers, besides Mynas. Am very poor at the skinning, although Mr. Beck approved a little of my heron. There is room for a great deal of practice in making up the skins. Hoped to go out to Maara but haven't the heart to take time out, now that I am just started to work again, so must disappoint them.

November 27

How beautiful all white-skinned girls will look after five years in these islands! Some of the half casts have fine features, but the coarse prognathous type certainly predominates, with broad nose and thick lips, and fearfully wrinkled in some cases, even while young. The men, as a rule, are of an even type and some are quite handsome of face, but the nose, lips, jaw, and skin don't look so bad on a man.

Mt. Aorhi (?) certainly looks fascinating, and I will be glad to pack up and strike out to climb it next week. Surely there should be something between here and the summit of that lofty peak. Noha, petrels, swifts, or something in the bird life should be there. Will have Tuaurae go with me, and, as he knows the trails well, we should get somewhere. As near as I can judge, we were between three and four thousand feet when up there before. This time I will take the barometer along and will have some idea, at least, about the altitude. Peale thought he was 6000 when he must have been 4000.

November 29

Went to every store in Papeete looking over shoes, and ended up by buying a pair of Elk soles at Maxwell's for 70 francs. Bought provisions to the extent of 127.75 francs,--quite enough for a week or more on high ridges. Left shoes to get half soled and hob-nailed for the morning. Went down to Beck's and talked over things, and he suggested that I tackle the Popinoo trip to Lake Valhiarie, just what I have longed for. So I am all astir for that with much to do this night in preparation, including delayed development of films, which cannot be left any longer. Well, I'll go to Popinoo and spend a week outside this abominable village at any rate, and will hunt birds somewhere.

November 30

Developed four rolls of films last night and fussed a-round getting ready for excursion until three o'clock, and then snatched two brief hours of sleep. My boy worked faithfully until two o'clock, when he dropped to sleep on the bed. He had most of the bags paraffined and plain, into which all perishable foods and books, barometer etc. are placed. Made up very complete medical kit including castor oil and plen-ty of iodine. I am equipped for at least eight days, and should we suc-ceed in getting a pig, will be able to hold out eight or twelve. Manu says I will be able to get a man to take me clear across the island, so that is what I'll aim for. Have one trouble to break in a pair of new shoes, but think they will work out O.K.

Popinoo: Arrived here about eight o'clock, and for a mo-ment was set back a little by the information that all the men were work-ing. But the police, or magistrate, post-master, or whatever he is of-ficially, took me to see "Chief", a fine fellow speaking just enough

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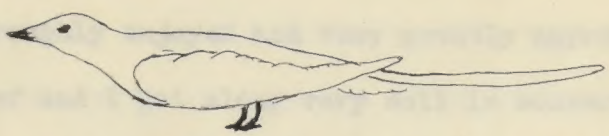
English to let me know that he understood what I was trying to say,--a bit more than I know Native,--so we got along fine, and he understands thoroughly what I want. He said the trip to Mateiae would take three days; so I doubled the time and called it six, but it will very likely take more, especially if we find Noha plentiful, when I am likely to send one fellow back after more grub until I can make up a good series of them. Chief says it is best to take two men, one for carrying, and the other for cutting the brush along the trail; very likely, they prefer to have a little conversation and company too, not being members of the society of Nature. Chief was quite elated to discover that I was collecting for a museum, and surprised me by calling me a naturalist. If a profound love for Nature is sufficient to qualify, then I am, but the real naturalist is the one who can see all life and matter and energy and interpret its true significance and exact relationships.

How glorious it feels to be contemplating such a journey as this! I am all enthusiasm, but our brief spurt up a hill to see the Chief forewarns me that my wind is quite deficient since being abed so long.

Arevareva--Cuckoo--tropic bird. Heard to whistle sharp and shrill during rain storm.



Mauroa--Bo's'n--tropic bird. Two long tail feathers, black shafts and white webs. Comes in with fish in morning.

Petea--apparently a petrel or shearwater.

Went down to beach for a sleep, but took glasses along, and, seeing some "Manu" down toward mouth of river, I worked that

way, and there saw a small shore bird with apparently white markings about the head and spotted body. Never paused to study him closely, but hastened back for gun, thinking all the time about sandpipers and curlews, etc. When I arrived prepared to kill, two fisherwomen stepped right where the bird was seen. Could not find him then.

I was on the verge of buying sardines, when a young boy arrived with an interpreter to invite me to "Kiki" with Chief Teriieroo. Went up and enjoyed a real native meal, except they tried to appease a stranger's taste with canned beef and sardines. I ate breadfruit, yams, and I even sampled the cocoanut milk sauce, which is slightly worse tasting than butter-milk that is stale. I was the only one supplied with plate and tools. The Chief and his Vahina used their fingers, even to the sauce. There is art in their eating, and it seems to be chiefly in drawing in a good full breath while sucking the fingers, with noise sufficient to make a dago seem polite when eating soup. Had two very interesting episodes during the meal. Vahina drove a small pig out from under the table with a broom, and two cats had a glorious round of fighting there soon after. The children did not come in the dining room, but sat squatted around the stove,--a heap of stones in a large swale beneath a very open slatted shed.

I thoroughly enjoyed and very greatly appreciated the favor. The Chief and I got along very well in conversation. Noha seems to be plentiful around Vaihiria. Went out in the afternoon and found my bird, which was a golden plover, and then added two Mynas on the way in. Missed Torea twice. Made up the plover and one Myna, taking one and one-quarter and one hours, respectively, and greatly amusing the natives.

Went to Chief's for kiki again, and talked "Manu" until eight. Made arrangements to take me for complete trip, even six, eight, or ten days at twenty dollars, with a bonus of one if we find plenty of Noha; also "kiki" and stage fare back here. From my talk with Chief, we will find a few birds at least, and some that should be interesting, if not new.

December 1

6:40 A. M.

Barometer Popinoo. 29.44 inches.

Chief's house. 50 feet alt. (?)

Leaving Popinoo about 7:00 A. M. this morning,--light clouds striated, heavens towards south.

Soon had to put on rope soles, for this is a typical Tahitian trail; in other words, where the river is no more than waist deep, the trail goes up its bed.

Noted Reef-heron, tatler, and myna up about two kilometers. A green dove asked to go to New York, so I shot him. Later, missed a singing thrush, that is, we could not find him, and so I suppose he flew off. Opea next victim found "Squeaking" while perched on high bamboo. Later heard the brown heron, Au, but he escaped without giving me a shot. A bo's'n bird went into nest on a cliff, and, being able to climb up within gunshot, I did so and fired, but saw nothing of him. The boys said he left at the first shot. In some bamboo I again heard the thrush, and by continuous calling bagged one, but the other escaped me. First new bird of the trip, and makes me feel a little bit happy all right.

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11:30 A. M. 7 P. M.

Bar. 29.24 inches. Bar. 29.25 inches.

Alt. rdg. 240 feet.

Cor. 190 feet.

The thrushes became so numerous that I soon had more than enough to keep me busy until dark, so we camped near some bamboo and I set to work. Spoiled Opea by pulling a bunch of feathers off his neck, but got good skins of Upa and three thrushes, but the last one ran into firelight. They make up very well and are easy except for trouble skinning so small a bird. Bodies about the size of an English sparrow, but heavily and loosely feathered, so that bird has the appearance of being larger than bluebird. They have typical long thrush bill, and mottled plumage above, tending towards a light brown, and quite yellow beneath. The most striking thing is the inside of the mouth and the tongue which are literally as well as figuratively golden. How interesting it was this morning to hear the first thrush singing as merrily, if not quite so well,as the American mockingbird and thrasher! Quite a change from the perpetual chatter of the myna about Papeete! Strangely enough, there are no mynas here. The last seen were being chased by Ruro, who is here, but not overly abundant. The boys cooked kiki, and I ate by snatches as I worked arsenic into the bird skins.

It will take a stiff and lame knee to turn me back, for this evening at seven o'clock we heard some Noha. I have offered the boys one franc each for Noha. Gave the gun and ten auxiliary cartridges to the boys after luncheon, and they came back at about 4:30 with four more thrushes and three shells, which is as well as I can shoot. They certainly enjoyed the sport,--a treat not many Tahitians get,--and I was saved just that much more time. Then we

killed one from camp just before dark. So tomorrow I will set to work fixing them, letting the boys hunt in the morning. With a full day of skinning, I should get a few done up.

December 2

The moon, in the last quarter phase, peeped over the eastern wall of the canyon half an hour ago, and so lighted up everything that he awakened me; not but what I had had enough sleep, for six hours in the mountains is ample. The insect,--sounds like a cricket,--is still chirping; the nearby river is rushing noisily sea-ward; the gentle breezes stirring the bamboo keep up a--Ruro calls from the river bank!--light dripping noise, not unlike the fall of collected dew beneath a Redwood tree. But perhaps, for once, we will get a little good weather in these mountains. Certainly the fleecy patches of light clouds, with stars shining between them, do not presage rain this morning. I am resolved upon a full day in this camp to prepare a complete series of "Amomo", the Tahitian song bird.

In America we always figure that the best way to get thoroughly acquainted with anyone is to go with them upon a journey of this nature. Here the plan works well, for, if you want to admire the Tahitian, go into the mountains with one or two of them carrying your outfit; you will find them the very best of campers.

Although nothing delights me more than to watch the natives build houses, I have brought along for this trip the two canvases to keep bundles dry, and, for the sake of speed, we are using them over a bamboo framework. That will leave the boys freer to hunt birds and cook food, and will give me more time to take care of birds. How I would like to take back an average of more than five birds per day!

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It would assure me of more such trips, especially if we find plenty of Nohas.

When down at the beach near the mouth of this Popenoo River, it was quite surprising to find a white granite-like boulder. This island is supposed to be purely volcanic. Then where--Ruro calls again!--does the granite come from? It would be interesting to find the source, for there must be something in contact with it, unless the lava has flowed out upon it. There are also several schist-like rocks, which may be, and very likely are, metamorphosed lavas, since they show no signs of banding. But one pebble I found looked like a metamorphosed stratified rock. The cliffs, thus far, have had true basaltic appearance. Where is the granite? I wonder if it is Orofena? Tomorrow should get some magnificent views of that defiant peak. Teriieroo guided a Norwegian up it several years ago, but he sent two boys along with Hall and Bisby. It will perhaps someday be scaled, but the man will have to be a lizard. Were I to try it, Tafai would be my guide. There is a fascination about climbing a peak the first time that certainly fills one with enthusiasm, energy, and courage; though I, for one, shake worse than the leaf of a quaking aspen after the climb is over. However, since Hall so recently made the attempt at Orofena, and since he reports very little bird life available there, it will quite content me to get to the summit of Aorhae, which will, I hope, be profitable for the Museum. It will certainly be pleasure enough for me to get up there and look around at the distant islands.

Noha calling at 4:00 A. M. on his way out to sea. Marvel of marvels! How does he do it? I wonder if they come in to search

for nesting sites during the daylight, or only at dark. Well, a camp among their burrows will tell us soon if they are seen at all by day. Heard Noha for several minutes, but as daylight approaches, nothing more is audible. Far out at sea, already the tireless little creatures are commencing their strenuous search for food upon the vast expanse of the blue Pacific.

6:30 A. M.

Bar. 29.30 inches. Rising slowly. May it presage fair weather!

12:20 P. M. Bar. 29.30 in. Steady. Clouds amassing.

7:40 P. M. Bar. 29.25 in. Had a very heavy rain between two and four o'clock. No stars tonight.

Everything went as planned, but not quite as well as expected, for, with a whole day's work, I got but eight birds skinned. The beans this morning interrupted progress considerably. The bamboo burns too quickly, but of course there is plenty of it on hand. The boys were quite tickled with idea of hunting, and returned at my calling kiki with five thrushes, one of which is a very dark brown, the feathers appearing to be those of an old bird. Is it possible that all the dozen so far obtained are young birds? I thought perhaps it was the male plumage, but it was a female bird. Since we have obtained most of these by calling, it may be possible that the old birds are more wary. The oldest boy took the brown bird and stuck it, rear end foremost, into a bamboo, but I could not get a thorough idea of what he meant. After eating, the two boys disappeared with the machette. I started down for a swim, but saw a marvelous spectacle, and so returned for camera.

The higher ridges were enveloped in heavy fog, and over the cliffs below the fog, gushed waterfall after waterfall as far

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The higher ridges were enveloped in heavy fog, and over the cliffs below the fog, rushed waterfall after waterfall as far

up the valley as I could see. A few drops of rain were falling as I took the picture, and I had a hard job getting to camp without being soaked through, so suddenly did the shower come over us. Found my canvas leaked considerably at the seam and wherever bamboo touched it. But I managed to keep everything under the other one, and went on with the work, until Upa came begging for a trip to New York.

Hearing me shoot, the boys yelled and soon afterwards came into camp with at least thirty pineapples. I surmised they wished to take a load down the valley, so gave them some money to buy bread and sugar and their kiki, and let them go, with the promise of returning early in the morning.

Walked back along trail a bit after finishing the eighth bird, and got a flying shot at a reef-heron, but missed him. Returned to camp and made everything secure. I have often said that I would get sick of pineapples at least once; have eaten three whole ones since two P. M.

Awakening at eleven I am inclined to think that I might have succeeded in getting sick, for there is an uncanny feeling in my nether regions. Well, if three whole pineapples won't make a man sick, hardly anything will. The stars are shining brightly with Gemini overhead. I hope the boys arrive early, and that I have the birds skinned against their arrival. The mosquitoes are quite bothersome tonight,--enough so to make me hang the netting. The ones here raise considerable welts upon one, which is quite unusual. The scenery during tomorrow's travel should be very gorgeous. I will collect only brown thrush hereafter.

12 P. M. Bar. 29.31 inches. Clear.

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December 3

3:30 A. M. Bar. 29.25 inches. Rain and clouds in patches. Not feeling sleepy after finishing a page of a letter to Duncan, I set to work and made up three birds, spoiling the third. Found candle light fairly successful, but have used up more than the night's allowance of candles. At midnight, the sky was very clear and starlit; now the moon is over the canyon wall, patches of clouds and showers. Slept rather dreamily,--and saw all manner of strange birds,--until sunshine aroused me. Even then I did not feel like arising, but hate to waste daylight, after having used the candle so long.

7:30 A. M. Bar. 29.29 inches. Alt. rdg. 200 feet.

12:15 P. M. Bar. 29.24 inches. Alt. rdg. 250 feet.

Following a shower.

6:00 P. M. Bar. 29.19 inches. Alt. rdg. 280 feet.

Alt. increase 80. Alt. cor. 270 feet.

Went out, but did not get any birds. Went for a swim. At camp this morning, I shot a thrush, but failed to find it after considerable searching. Was making a second search, when a native pig hunter with a pack of mongrel hounds and spear came along with two companions and my two boys. Not being allowed the use of firearms, they resort to this ancient, primitive method of providing meat cheaply .

Packed up during a shower and took the trail. Shot a very large reef-heron in a tree above river bank, and one of the boys climbed after him. My knee keeps me out of the brush. Missed Torea a couple of times. Stopped to camp opposite a small overhanging cliff, beneath which were what I believe to be swift nests.

December 3

5:30 A. M. Bar. 29.25 inches. Rain and clouds in patches. Not feeling sleepy after finishing a page of a letter to Duncan, I set to work and made up three birds, spoiling the third. Found candle light fairly successful, but have used up more than the night's allowance of candles. At midnight, the sky was very clear and starlit; now the moon is over the canyon wall, patches of clouds and showers. Slept rather dreamily,--and saw all manner of strange birds,--until sunshine aroused me. Even then I did not feel like arising, but hate to waste daylight, after having used the candle so long.

7:30 A. M. Bar. 29.29 inches. Alt. rdg. 200 feet.

12:15 P. M. Bar. 29.24 inches. Alt. rdg. 250 feet.

Following a shower.

6:00 P. M. Bar. 29.19 inches. Alt. rdg. 260 feet.

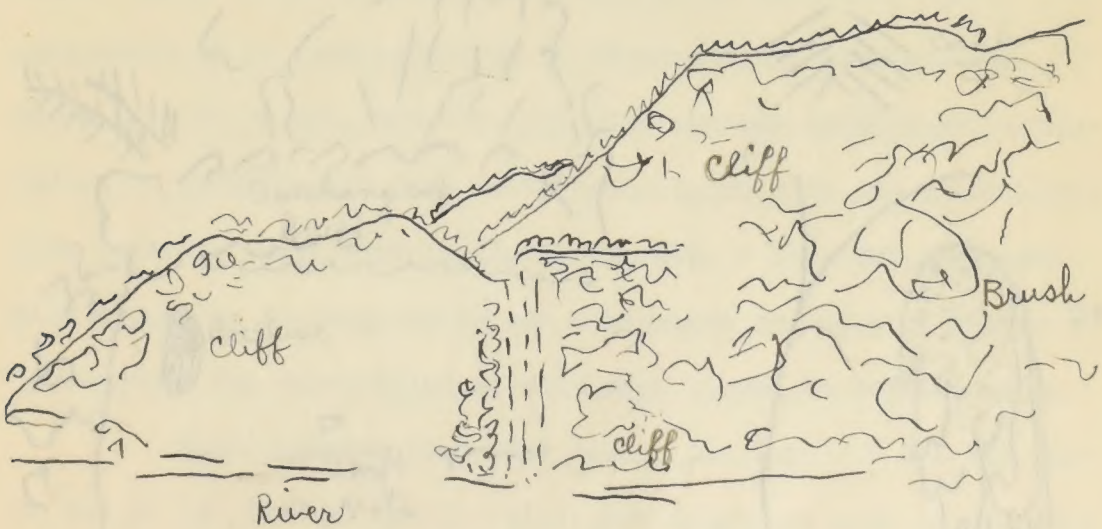
Alt. increase 80. Alt. cor. 270 feet.

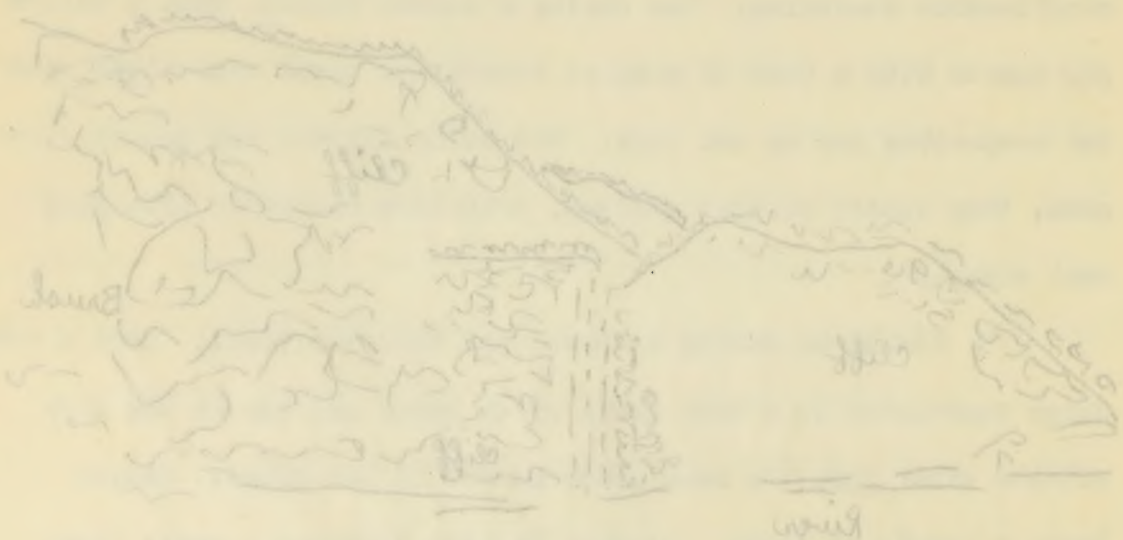
Went out, but did not get any birds. Went for a swim. At camp this morning, I shot a thrush, but failed to find it after considerable searching. Was making a second search, when a native pig hunter with a pack of mongrel hounds and spear came along with two companions and my two boys. Not being allowed the use of firearms, they resort to this ancient, primitive method of providing meat cheaply.

Packed up during a shower and took the trail. Shot a very large reef-heron in a tree above river bank, and one of the boys climbed after him. My knee keeps me out of the brush. Missed Torea a couple of times. Stopped to camp opposite a small overhanging cliff, beneath which were what I believe to be swift nests.

Undressed and swimming across river, looked them over. About six of them, but apparently deserted. Came back to camp and to work upon my heron, for they require two hours, at my present rate of progress. Some small black birds are hovering about the cliff, and send my hopes bounding skyward. Made a very surprising shot, and dropped one on opposite bank. Small boy swam across and came back holding it well above the water with one hand. Alas! It was but Opea, the swallow. Let the other boy take the gun and go after Au, the brown heron, while I worked on Otu, the Reef heron. By candle light, I made up Au, and, although rather shot up,--the boy used #6 shot very close,--I succeeded in making a skin of him. Otu measured 68.5 cm. from tip of beak to tip of toe. Rained a little just before turning in.

A beautiful little waterfall along Popenoo, where the water shoots out a meter clear of the cliff at the top, and then falls directly into a pool level with the River . Perhaps 75 m. high.



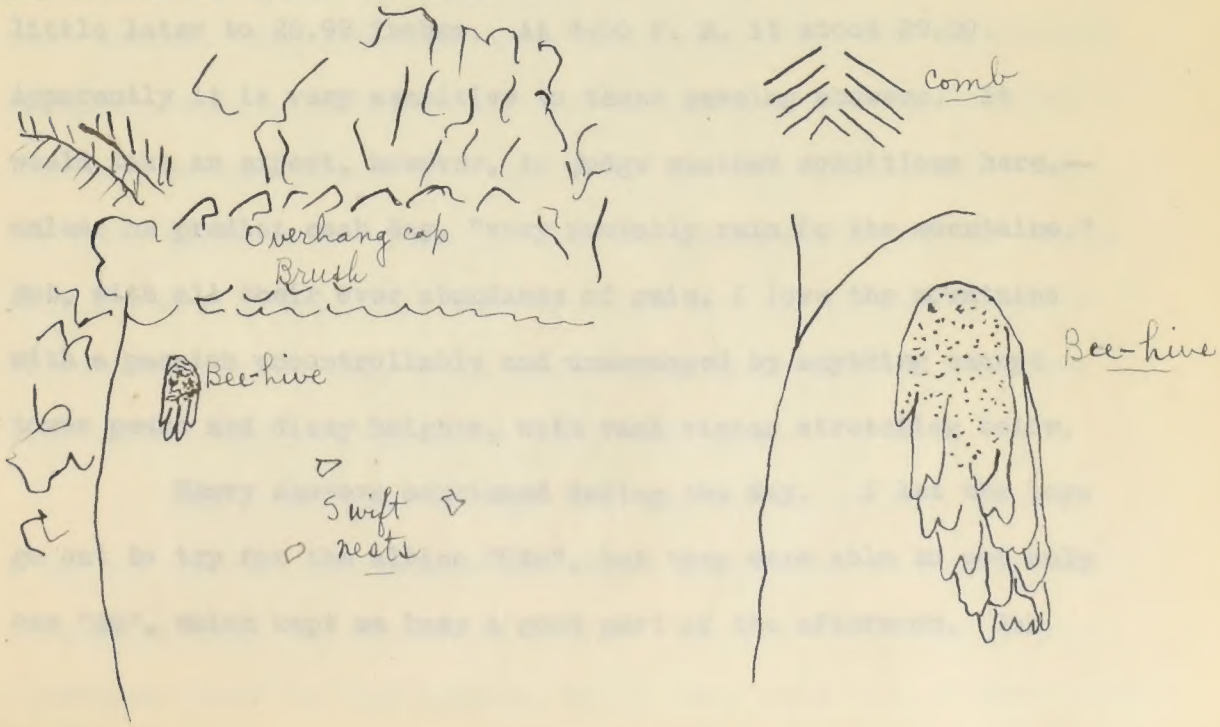


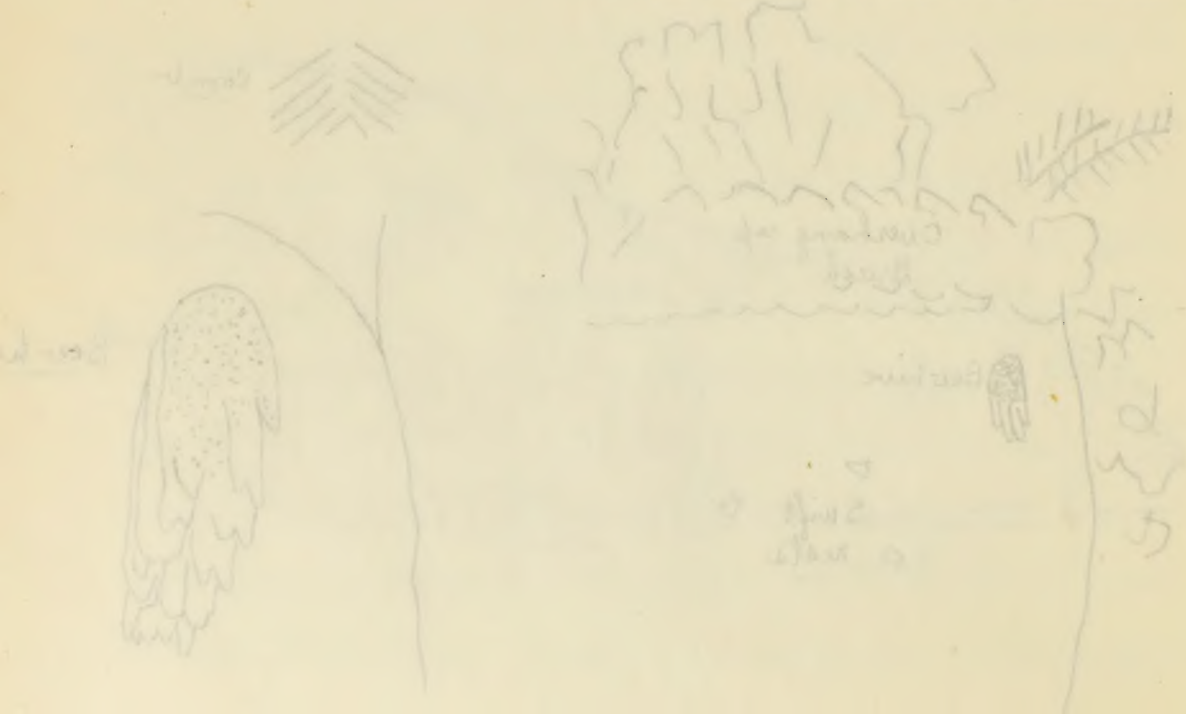
December 4

8:00 A. M. Bar. 29.16 inches. Alt. rdg. 301 feet.

Arising before five o'clock, I set to work upon Opea, and with great patience and perseverance, made a passably fair skin, neck still too long. We swam across the river with two long bamboo poles, and knocked down three of the nests. They are made of moss glued together perhaps by saliva, and stuck to the side of the cliff. Two were cleverly placed in a small hole about the size of a number 8 hat. Packed up and left camp shortly after eight o'clock. Made a good shot at thrush flying across river. Missed Torea, and, worst of all, a white specimen of Otu. There we stopped for lunch, hoping he would return, but he has not.

The following sketch shows roughly a cliff where the valley divides, upon which an enormous beehive clung. I tried in vain to shoot it down, and the boys failed with rocks. The comb is interesting because it is built in a triangular form of two series of layers on each side, the lower end of each layer consisting of a characteristic double curved point.





A little higher up, we were crossing the river when the white Otu was flushed, and here we stopped for lunch, hoping he would return. A blue one flew over, and I missed him. Seeing white one again. Am going to try to get them, but they have gone down the valley, and if I stop a day for every strange bird, I'll never get across the island in ten days. The house they mentioned is a cave, which, during the present heavy shower, is very appreciable. In the further extremity of it rests a human skull of a prognathous type, in spite of these boys' declaration that it is French. Has a facial angle of about 80°, and not much brain capacity.

11:25. Bar. 29.05 inches.

Alt. rdg. 400 feet.

" diff. 100

If this shower proves to be a real rain, we shall camp here for the night. I should have bagged one Otu, and I would have enough to do to pay to sleep here. Two have passed this camp.

During shower Barometer dropped to 29.02 inches, and a little later to 28.99 inches. At 6:00 P. M. it stood 29.00. Apparently it is very sensitive to these passing showers. It would take an expert, however, to judge weather conditions here,-- unless he predict each day, "very probably rain in the mountains." But, with all their over abundance of rain, I love the mountains with a passion uncontrollable and unassuaged by anything except tower peaks and dizzy heights, with vast vistas stretching below.

Heavy showers continued during the day. I let the boys go out to try for the albino "Otu", but they were able to get only one "Au", which kept me busy a good part of the afternoon. Our

Heavy showers continued during the day. I let the boys go out to try for the albino "Otn", but they were able to get only one "An", which kept me busy a good part of the afternoon. One

next trip must be a full day's journey, with no stopping until near the Noha nests this side Vaihiria. Tomorrow being Sunday, the boys do not desire to work, but are willing to go out and "Pumpum Manu", so I will let them have that pleasure, while I write letters and, perhaps, skin the birds they bring back. After an early kiki, I wandered up both forks to the first crossing of each, occupying the evening until six o'clock, when I took a shower. Obtained one specimen of the Ruro, kingfisher.

In camp this evening, we had a contest of vocal powers. I attempted mimicking a Tahitian throat twisting squeak, easy to commence from a high-pitched goat bleat. The oldest boy then tried in vain my one yodel; I fear he does not use his tongue enough. A good pool near camp is a very handy thing, for, even though one walks through several shower baths a day, there is nothing so good after a shower as a fresh water plunge.

The three pig hunters camped here in this cave last night, leaving their spear here. They passed our camp early this morning while I was skinning birds, and I neglected to photograph them and their hounds. They were all three laden well with "Paa" in sections of bamboo, and, according to my boys who carried on a conversation with them as they passed (in high "C"), they got three pigs,--meat for their families for a week. They are particularly fond of eating Feis cooked with the pork, which accounts for the strange sight observed yesterday of Feis being hauled into the mountains. Perhaps they did not desire to go on to where they grow.

There is a gnat in this country, not unlike what we call a Buffalo Gnat at home from their humped appearance; it is terribly irritating along the stream-bed trails. Our cave certainly makes a commodious place for the Sabbath, but we must reach Fei at least Monday.

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December 5

7:15 A. M. Bar. 29.08 inches.

With such variation in barometric readings, altitudes will be but approximate, within fifty or a hundred feet; but I will, no doubt, be able to guess nearer than Peale did, who thought he was well over 6000 feet high, when only two peaks attain that altitude. Had a good long sleep last night, not being in a hurry to get away this morning. While down at the river washing up, Au objected to my presence, so I returned for the gun, and broke the Sabbath by gathering him in. He fell into the river, and running down stream, I found a place where the current brought him within my reach.

At the rate we are eating up the grub, it will not last very many more days. We have one more cooking of beans, the rice is gone, and our inroads on the canned goods are tremendous. One can of meat is made to do for three of us, by boiling it and making a gravy with flour. That will help when we reach the Fei country too.

My religious guides, who would not shoulder their packs on the Sabbath, have gone forth with gun and ammunition to kill birds. I wish them luck, and hope they bring in enough to keep me busy tomorrow morning if I awaken early, or even this afternoon.

December 9

7:15 A. M. Bar. 23.08 inches.

With such variation in barometric reading, altitudes will be but approximate, within fifty or a hundred feet; but I will, no doubt, be able to guess nearer than Poole did, who thought he was well over 6000 feet high, when only two peaks attain that altitude. Had a good long sleep last night, not being in a hurry to get away this morning. While down at the river washing up, an objected to my presence, so I returned for the gun, and broke the Sabbath by putting him in. He fell into the river, and rumbling down stream, I found a place where the current brought him within my reach.

If the rate we are eating up the grub, it will not last very many more days. We have one more cooking of beans, the rice is gone, and our increase on the canned goods are tremendous. One can of meat is made to do for three of us, by boiling it and making a gravy with flour. That will help when we reach the Pot country too.

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BOOK VII

Tahiti

Papenoo

Dec. 5---Dec. 16, 1920

Dec. 5 (Cont.)

Last night the rats got after the birds I left out to air and dry. They selected, of course, the two brown herons, which, except for the brown thrush, I consider the most important thus far collected. They damaged both considerably about the base of the primary wing feathers, a spot where it is difficult to get all the meat off, and hard to get enough arsenic upon. I hope I had plenty of poison to kill the rat. Replaced feathers as best I could, and rewrapped the two birds so that they may yet make specimens.

There are two orange trees before this cave, but apparently the place is so well known and popularly visited, that the ripe ones are kept picked. I will be glad tomorrow to pass some bearing trees, and once again get my fill of the delicious fruit. Guava trees along the stream banks, but no ripe fruit discovered thus far.

A spider about the size of a baby Tarantula has taken up a station in our grub box, where he finds foraging for flies very profitable. I wish he would go over to the birds and keep them

away there.

The hunters returned at noon, just as I finished my second bird this morning. They brought in a good bag of two brown herons, two kingfishers, and one thrush,--enough to keep me employed the rest of the day, and part of the night. How glad I am that we stopped here yesterday,for, after showering several times this morning, the Na is now descending in torrents! To wash for luncheon, it was merely necessary to hold one's hands, cup fashion, beneath the drippings from our cave roof, and now the boys are washing the dishes by merely placing them under the "eaves". A heavy clap of thunder is still rumbling. The river below is up and raging furiously, and a small rivulet opposite has become a torrential stream of no mean dimensions. How fortunate to be beneath such a good thick roof! Our only trouble is the splash from the dripping eaves. One of the best showers I ever witnessed, and accompanied by sufficient thunder and lightning to make it unusually interesting. These boys know of no deaths by lightning, and there wouldn't be since the dwellers of the mountains moved to the shoreline. The last report was a regular snake-flash and crash. It rained most of the day, and the river is roaring considerably at nine o'clock tonight.

Had great success making skins today, and this afternoon managed to turn out a kingfisher and one heron in less than an hour each. Total is now twenty-six birds, which is much better than staying around Papeete, also a little more expensive. This cave would be a good place to come to for a stop of about one week, just to hunt up and down the three forks. The main trouble with it is the lack of native foods. I see now why the pig hunters carried

Feis up here with them.

My men have struck on going to Vaihiria; perhaps that was what was in the wind when they desired to stop here yesterday noon. They say "No Feis" along the route, and fear a shortage of "Kiki"; that is the trouble with youngsters. Men like Tafai and Tuaurai would be out getting food, but, of course, they cost more. Well, if the river is down tomorrow, we shall retreat down stream. I cannot get them to go to Papenoo for one hundred francs more grub, which would last us well over five days. I wonder if Tuaurai knows this route. He would be a fine fellow to have along. Well, my heel will likely get sore, once I start wading anyway, so I should worry!

What disappoints me worst of all, is that this trip should be made this season; in fact, it should have been made in October, when we would, no doubt, have found the thrushes and swifts nesting. Well, I blundered, I suppose, by stopping at sight of the thrushes, and then again at the swift nests. We should,--but why go over possibilities? Here we are, having nearly exhausted our grub supply, and the evening after next must return to civilization. These trips are apparently times of celebration to the natives,--opportunities to get their fill of canned beef, for which they have a particular fondness. Every time we have opened a can that has been stew or other than beef, they have been disappointed. Yesterday I cooked beans, and, after eating an early dinner of rice-lamb curry, what did they do but turn to a couple of hours later, just before turning in, and eat up the whole pot of beans. Darwin was right,--I never did see men with such appetites.

Our best plan would probably be to make this particular trip next October, as a finishing job for this particular group of Islands. I felt like writing volumes of letters tonight, but now

am too mad to write a readable missive, for the mood would be bound to express itself somehow.

6:30 P. M. Bar. 29.05 in.

9:30 P. M. Bar. 29.09 in.

It is certainly variable.

December 6

7:00 A. M. Bar. 29.02 in.

Rained a little all night. River not swollen much this morning.

I am still trying in vain to make some arrangements with the men, but can get nothing satisfactory from them. Believe I will go with them to Popenoo and see the chief, buy more kiki, and return here tomorrow, make the journey over the ridge, and search for Noha, not stopping for anything except the rarer birds. Will carry gun to Popenoo and only shoot the rare ones, like white heron, ducks, and sandpipers.

We did not get started until 9:30, but traveled right along and reached the Opea camp by 11:00. I missed two Au along the river, and the white Otu left his habitual perch at the first shot; he stopped awhile on a rock, but would not permit my stalking him. I just scared a reef-heron into some trees across the river, and the boys have gone after him,--he died over there.

A little later, I bagged two kingfishers with one shot. That shot scared up an Au, which the older native got on the wing, making the total of our trip thirty birds. We stopped for luncheon below our first, or pineapple camp, having made that place in three hours of traveling, and the boys claim we have but one more to do; but two more hours would be good time.

Beheld the strange phenomenon of a complete circular rainbow. Of course, it was merely a prismatic halo around the sun about 30° away from it. Not very brilliant. My heel is so little affected by the traveling, and my knee is now so negligible a consideration, that I am contriving every possible method of continuing the proposed Vaihiria trip. Will send in a report tomorrow morning, and let Mr. Beck decide what I shall do. Spending one day along the seashore beyond Popenoo for terns, which will be profitable, and at least better than returning to Papeete.

But upon arriving at Popenoo, I decided to run up to Papeete for the day, myself. The two kingfishers I killed at one shot were nesting. We got two more farther down; also another reef, and two more brown herons, and a swallow, which ran the total for the day to nine birds,--and a night shift of skinning.

We bathed and changed clothes at the bridge. I set to work at five o'clock, and turned out one large Otu before dinner, also made up a few bodies. After eating, the only bird that took more than one hour was the other Otu. The four kingfishers I managed to finish in three hours and twenty-five minutes, which surprised me considerably. To bed at 2:10 A. M. Opea I left for daylight and a fresh start. Slept briefly but soundly. It took seven hours to come down.

December 7

Opea was not so successful. Packed all birds in box, and left two bundles here against "plenty kiki, hare Vaihiria", and am waiting for the stage to leave now. Birds do not look quite as well as they should.

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At Papeete: I found that Mr. Beck had had his heel lanced, and found therein a piece of wood about the size of a match, and 15/16 of an inch long. No wonder he didn't get well! He thinks he will be able to get around by the time I return, for he has agreed to a heavy supply of kiki, three dollars a day for two men, and a bonus of one franc each for Nohas found. Thursday, then, if all goes well, will see us assailing the Popenoo again, and this time we'll get somewhere into the interior, and then it will be just as simple to go out the other way.

Mr. Beck was quite pleased with my birds, and offered a few criticisms about making them up. Too long necks are my chief failing. He was quite surprised to see the brown warbler,--for they were not thrushes, after all,--but the notes allow for wide variation in them. As not enough material has been collected heretofore, considerable question exists as to their relationships.

So I have ordered grub enough for ten days at full rations. The natives don't care how much it weighs, and we don't mind how much they eat, so long as they get us to Noha's nesting places. Vaihiria is a possibility again. Is anything going to break up these plans?

December 8

Spent morning trying to skin fledgling myna birds, but was unable to do so, the feathers proving to be altogether too soft and delicate for my rough handling. Spent afternoon, when not making up for lost sleep, searching for buckshot, and purchasing a few little last articles. The evening was occupied paraffining canvas and packing up the kiki. Wrote a few hurried notes, and closed up

December 5

Spent morning trying to skin fledgling myna birds, but was unable to do so, the feathers proving to be altogether too soft and delicate for my rough handling. Spent afternoon, when not making up for lost sleep, searching for bookmark, and purchasing a few little last articles. The evening was occupied partially making canvas and packing up the kiki. Wrote a few hurried notes, and closed up

letters, for fear I wouldn't get back before arrival of "Marama". My correspondence this month is going to be very low, as it was last.

Today I met Mrs. Lopaz of Fresno and her companion, a New Zealand lady. They are tackling Fantana tomorrow, and wanted information, which I gave them; also loaned one of Darwin's books to them.

December 9

The stage was not going to take me and my load, until I followed the lead suggested by a lady in it, an American tourist going to Point Venus for pleasure. She said they could go tomorrow all right, so I begged them to do so. But fate steps in again, in the form of a "Halakula", or dance, at Popenoo Saturday night. So the very best arrangements I can make, is to have three boys take my heavy outfit to the cave tomorrow, there remaining myself, while they return for the big jamboree. They are to go back Monday, and then take me over the Vaihiria trail.

So I went out hunting this morning, and wasted many shells, but did succeed in bagging a varied selection of birds; three terns, noddy, black-cap, and white, and one reef-heron. The two white-breasted terns requiring washing; I had all I could do for the afternoon. Am too sleepy to write at length tonight, and I should be writing letters anyway, if I were not.

December 10

5:50 A. M. Bar. 29.50 inches. Alt. rdg. 0 feet. Light clouds.

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We got under way about seven, and made good progress all morning. I took but one shot at an Otu, which came temptingly overhead, but he was too far up. Saw very few birds along the route,--a few tatlers, and, of course, the myna,--until we had passed the Vanilla plantation, where they ceased. Heard a few warblers and kingfishers. Saw several reef-herons and one tropic bird.

The Popenoo is low today, as compared with the last journey. I have not yet been in to my waist, though the last crossing, the sixteenth by tally, reached my hips.

Here we came upon the pig hunters, whose tracks we have been following all morning. They had just made a good catch of a two hundred pound boar, and now have him alive, with feet tied around a pole by bark strips and his jaws tied with bark. What they propose to do with him I do not know, unless they expect to take him alive to Popenoo. But we must be going.

Luncheon at the pineapple camp, where that fruit finished the meal to satiety. First signs of mutiny; the loads are perhaps heavy, but with three men to carry them, they ought not to be so bad. Signs of showers for the afternoon, but hope to make the cave in spite of them and mutiny. At the cave I would be perfectly at home, while the men attend their "Hulla hulla". I hope they don't expect fifteen francs a day while going to and from their dance, because they are not going to get it.

Certainly, fate is on the side of Nohua (which is, perhaps, the proper way to spell the word as the natives pronounce it), but I have hopes, and certainly am going to make some strenuous efforts to find them. My one big expectation and desire for this afternoon is that the white Otu will be at his usual post and will permit at

least a sportsman's chance at him.

12:00 M. Bar. 29.27 in. Elev. rdg. 220 ft.

3:20 P. M. Bar. 29.00 in. Alt. rdg. 450 ft.

Slightly cloudy for awhile, but no rain, so take that to be about the elevation of this Cave of the Deadman's Skull. (Had a little fun tonight with the same, by placing it over the flame of the candle. The light shining through the bones had a very gruesome effect. It would make a splendid Halloween mask head. With an electric bulb in each eye, and one inside, it would be very attractive.)

We reached the cave in good time, even after several stops for "Smoke kiki". The Tahitians, women as well as men, take very naturally to smoking. Well, one cannot expect to keep a journal and smoke too, so I prefer the former to occupy my spare moments or leisure hours of contemplation.

We found that end of the cave farthest from the human skull already occupied by two natives, who passed us during the day on their way here for fresh water prawns. So we are located in near his majesty of the Popenoo, and I am nearest the bodiless and soulless remains. "Alas! Poor Yerek!"

Had a very refreshing swim and bath, and washed out clothes worn during trip. Then ate an early dinner of beef and rice, augmented by prawns and Fei from our neighbors, to whom we gave of our fare in return. They boiled their prawns in a section of green bamboo. What helpless babes civilization makes of us!

After dinner, I watched a spider spin the circular part of his web. He had the radii and a few temporary circular braces finished ere I noticed him. How industriously he went round and round, until very near the center! No sooner had he completed his net than a gnat was caught in it. How quickly the spider had him,

and, carrying him to the center, proceeded to have a dainty morsel of kiki after his strenuous labors. The web was not perfectly spaced at all, although the spider appeared to have one rearmost leg on the last strand placed at each sticking of a thread on the radii.

Being altogether too tired for hunting, myself, I let the native go out, and he brought in two reef-herons,--the only catch of the day. I did not desire delaying our progress by hunting, so refrained from going after common birds.

How many thousands of human beings have passed a night beneath the shelter of the mountain above me? This is of a formation of volcanic conglomerate, that below being of round pebbles, while the opposite layer appears more like the unwashed fragments of a talus slope. If the river made it, it has since worn its channel some thirty feet below this point, a matter of but a few thousand years for such a river of boulders as this is. The grade here is rather steep. Above here, we should gain altitude rapidly.

The river today was not so deep as formerly, only once or twice coming above my hips. I started out to count the fordings, but gave it up, and reverted to the method of removing one auxiliary cartridge to another pocket each time. I may have forgotten or over counted, but I found twenty cartridges shifted. The rope-soled shoes, which I put on in new condition up here last trip and wore out hunting Saturday evening, are now completely worn to shreds. A rather short service for ten francs! How fortunate that I brought another pair!

The five Tahitians are soundly asleep, with nothing to do until tomorrow. The two new men look like jolly lads, all right.

Rather tall, they are, for natives, and with aquiline noses. The two prawn hunters inform me that this skull is that of a native, as one can plainly see.

8:00 P. M. Bar. 29.06 in.

December 11

6:30 A. M. Bar. 29.09 in.

Slept rather uneasily last night, mostly because of a swollen tonsil, which should have been taken out long ago. The prawn (Una or Ora) hunters departed this morning for their day's work. I should have enjoyed watching them, because one of the two dives after the prawns and captures them with a hand net. He has made himself a pair of tight-fitting goggles, which enable him to see very well beneath the water. Fine fellows, for whom I opened an extra can of beef today, which squares us up with them in the exchange of food.

Photographed them and the other boys this morning, giving the graflex all the time and light possible by instantaneous action. Had one boy with "pario" and the skull suspended from his belt, holding the pig-spear in a menacing attitude. Let two older boys go out after Manu while I skinned the herons. I kept the younger lad in to keep beans boiling, which he is doing excessively well.

The sun broke forth this morning, but already, clouds are appearing. If this were not such a splendid place to stop for the day and Sunday, I would shove on farther up the valley, since the boys are not returning to Popenoo until tomorrow. I may decide to move this afternoon, unless they bring in a lot of birds this morning. They brought in six, which will occupy the afternoon. Nothing new or unusual.

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This afternoon the new men slipped away with the gun, and ruined two warblers and a kingfisher by using large shells. I opened a can of butter for dinner tonight, which again tells me that I must ration them on delicacies, since they have no consideration for anything but the present indulgences. I find them about on a grade with our trashiest sheep-herders in America. Thank God, it is not necessary to hear or understand all of these fellows' conversations among themselves! I infer it to be rather low, as it sometimes is, apparently. As for the morals of this place, I am afraid they are ninety-nine per cent. impure; the other one per cent. may also be, but I give them the benefit of the doubt to that extent. What I cannot understand is, how any white man can come here and join in with the general corruption that abounds. Least of all how they can ever intermarry, even with a high grade cast. Certainly, they cannot be thinking of their future, nor of their probable descendants.

December 12

Awakening this morning long before daylight, I found my watch run down, but it must have been about eleven, because it was six hours before daylight. Wrote a two page letter to Grandmother, and enclosed one page to mother, which the boys will take to Popenoo in the only envelope I have here. They will stamp it there, I hope, and mail it in time to catch the "Marama". That will help a little, anyway.

I was surprised when the fellows took the gun and went out, but did not care at all, since they agreed to go across the stream into bamboo thicket and search for "Mamomo", the warbler, of which they obtained two yellow specimens, not this year birds

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apparently. The brown one was evidently a rare specimen, perhaps a melanistic phase of plumage, for we have come across no others like her. Several of the specimens killed yesterday, including the dove which appears to be a young bird, required washing, so my time at their skinning was not very rapid.

I would like to know the cause of, if it be not the mosquitoes, and a remedy for a very bothersome itching, especially around the edges of my feet. It commences immediately after I retire to bed, and continues throughout the night. It may be a phase of prickly heat, but I think mosquito bites, past and present and partially imaginative, are the cause of it. I thought a swim would check it awhile this evening, but it did not.

Finishing the birds about five,--by my guessed time,-- I went out for a stroll up the two forks of the river to the first fords. Flushed the great white Otu at the forks. He is a very wary bird, and will not allow a close approach if he notices me, and, once flushed, flies to a good safe distance. Perhaps I reached him with one or two shots that first day. Why could it not have been more, or at least, one on the tip of a wing? Why does a rare specimen so delight in tantalizing a collector? The blue ones are bold enough to give us a sporting chance at them, at least. Will try for him twice tomorrow, before and after my hunting trip up the Orehena stream. The most important occurrence was that of two warblers across the stream from their bamboo thicket in an Hibiscus wood. There I was calling Upa, when I heard a clucking and twittering in the low brush beyond a log. Suspecting some new ground, or brush bird, I was a little disappointed when the warbler appeared. Shot one, the other retreating at the report of the gun to the safety of the bamboo thicket, across stream. Tomorrow morning, I will spend

more time with them, and hope to learn a little more of their habits. Will, of course, watch for a dark bird.

December 13

Was kind of sleepy this morning, and so did not get into the field early. Again my carelessness flushed the white Otu. Ascended the Orohena trail to the fourth ford. Found Upa callable between showers, and Mamomo wherever bamboo thickets were.

Elevation 800 feet. Along this trail, the tracks of wild cattle were prevalent and fresh, though I saw or heard nothing of them. The birds here were of the three kinds: Upa, the green fruit pigeon, being usually present near citrus fruit trees and Hibiscus; Ruro, the kingfisher, along the water courses; and Mamomo, the warbler, in the bamboo thickets. I am at a loss to find a method of either calling or attracting Ruro, although the first ones I took, in Mission Valley, seemed to come to my sucking call. The same is very effective now upon Mamomo. Upa continues to be the ever curious bird of the Punaruu.

What a curse this abominable itching is! I believe it is infused into my blood, perhaps by mosquito bites, but certainly its widespread irritation is greater than the actual bites. However, it is mostly about the feet, hands, and head. Tonight, the rear of my left palm and two localities on the sore-nob of the back of my right hand are the leading points of the disturbance. Also, I am wondering what is the cause of my sleeping but three hours the first stretch, which always has been five hours before. Invariably, I awaken about an even three hours after retiring, with all signs of sleepiness dispersed. Often, four or more hours of writing by candle light will not bring further sleepiness. If it were not for

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the fact that I do get sleepy again during the day, I might think I had surpassed Edison's four hours of repose by one full hour. But to feel perfectly hale and hearty and ready for vigorous work, I require, in all, at least six hours of sleep. Eight hours is altogether too much, and makes me feel logy-headed all day. Five to six hours of good sound sleep is ample, and, furthermore, is quite enough time to waste in idleness.

The boys returned from their jamboree this evening, bringing in an eel, small fish, and prawns. The latter they boiled in a section of bamboo for my dinner, but, being decidedly busy with two excessively fat pigeons about that time, I did not get to eat them until they were well cooled off, which makes them better, I believe. The boys ate some rice, and I did not notice what else; then, like the typical children they are, sprawled out on the leaf-strewn cavern floor, and were asleep before their cigarettes were finished. At my awakening about mid-night, they rallied, and spread their canvas, wrapped themselves in the counterpanes they invariably use for blanket, and have long since returned to slumber-land. How pitiful is the condition of men who can but eat, sleep, and reproduce; and these natives are falling down terribly in the latter of their three characteristics.

After a week of very beautiful sunshiny weather, spent trying to get started upon this journey, we are now entering, apparently, another spell of rainy and stormy weather. Today was one heavy shower after another, and they have persisted throughout the night. Fate seems invariably upon the side of Nohua, but not in the form of grub this time. Not only is our larder well filled with hard tack, bread, tea, coffee, rice, beans, flour, and tinned beef;

but we are also prepared for veal and pork, not to mention possible game fowl. The boys brought back with them three likely looking hounds, which will, no doubt, scare a few birds, but will also run down some meat for us. To the ancient and other odors of the cave, we have added now that of wet and steaming dogs. But dogs have associated with mankind since those days when caves were in vogue, so I, for one, have no objections to make. Besides, there are so many dogs with whom I would rather associate than with a great many of my fellow-men, that these are welcome to a fair test of parlor behavior at least.

There is a worm in Tahiti,--of whose scientific position I know not,--which is very prevalent in damp woods. It has in the neighborhood of at least sixteen segments, each bearing at least two legs. It is a perfectly harmless little creature, but one which leaves a decidedly creepy and crawly feeling in passing over any portion of one's anatomy, especially when mixed up in the bed clothes.

A nice shower is now passing this point. One can hear these storms approaching at no little distance, so noisy is the patter of the large rain drops upon the broad leaves of the forest. This is especially so in the neighborhood of the Fei, which forms a veritable drumhead for the rain to beat upon.

There is one decidedly pleasant feature about writing by candle light; every once in a great while, a mosquito, having indulged to satiety upon our good red blood, will get so full of curiosity (no doubt, a characteristic of my blood) that they will fly over the flame of the candle. The sizzling of their delicate wings is a very gratifying sound. Though, of course, the candle has its drawback, because it aids them in locating the geosyn-

clines where boring is profitable.

Which figure brings us around to geology. Darwin would never have been satisfied with three days, if he had ascended this valley. Some geologist, some day, will stop over here for a week or two. If he does,the Popenoo valley offers him quite a treat, for today in the Orohena stream bed, I found numerous pebbles of a hard gray sandstone, not to mention the various metamorphics, granites, and lavas. This is no volcanic island shoved up from the ocean floor. Here are all the elements of regular geology. Lava outpourings predominate, no doubt, but somewhere along the precipices of this valley can, no doubt, be found the source of these other boulders. The sandstone may possibly be fossiliferous, and, if so, might throw some light upon the age of volcanic activity. However, as there is but very little hope of mineral resources, and, as the French Government does not seem to realize that there is anything more than a cocoanut fringe on this island, some time may elapse before the geologic exploration of this valley is ever made. I am on the lookout for the situation of these non-volcanic rocks, but they may not occur up the other valley where our trail leads.

December 14

As I surmised, it has poured at regular intervals all night, until the rivers are well up, and continues to pour every few minutes as the heavier portion of the clouds pass over us, with good steady rain between times. It would be the height of folly to move from good shelter under such conditions, risking the wetting of the birds and provisions, as well as of our clothes;

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also the danger of crossing muddy streams with unseen bottoms. Having worked Sunday, I can myself remain in camp with a perfectly clear conscience; but the idea of keeping three idle men at fifteen francs each and feeding them as much is rather disconcerting, to say the least. Well, I'll feed them beans whether they like it or not, and maybe they'll go out pig hunting even in the rain, for to their nearly naked skins warm rain is little more than a cool blessing, and preferable to sunshine. Here have we two extremes, the unburdened, almost unclothed savage and the rather fully equipped scientist. What a contrast it is indeed, but what a difference! I wonder if they actually enjoy the grandeur of these hills, when their sole purpose of coming up here is to obtain food.

We are going to move as far as possible with a late start. I have had great difficulty in getting the natives to do up the dishes. Once their stomachs are full, they flop over and go to sleep. But the servant problem is now solved in regards to the dishes at least, by the presence of three lean and hungry hounds.

10:00 A. M. Bar. 29.00 inches. Elev. 450 feet.

12.40 P. M. Bar. 28.85 inches. Elev. 570 feet.

Made one last attempt for the white Otu, but he was not at his customary haunt, upon which I crept with every caution. From a huge boulder down stream half a kilometer he bade me adieu, no doubt with considerable relief. Coming upon the river suddenly once, a young blue heron flying out from the bank dropped with a broken wing on the opposite shore, and a number ten finished him. One of the natives played retriever, for which they are especially useful. Along the trail I came upon a cow and what I thought to be her half grown calf. Walked up as closely as I dared, and fired at the calf's head, but he was too far away. As they disappeared, a

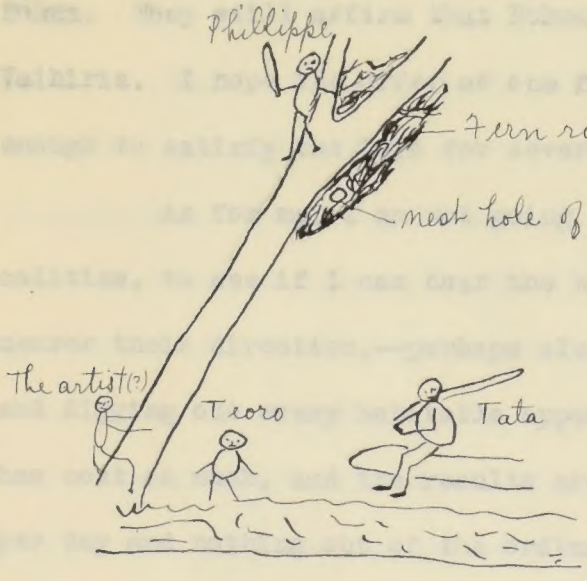
real young calf jumped up from beside the cow. The dogs failed to take in after them. Later they jumped a real beef and we made for their assistance. We found them holding, without effort, at bay a large black and white bull. I let him have two charges in the head and he shook his ears at the shot and left. Turned the dogs later, and by climbing or walking up a sloping tree I was almost able to get real close to him. He started to leave, so I tried a couple of number six shots behind the ears,--a great place to shoot at a bull! One of the dogs, the older one, is still staying with him and we are holding up for him. Have eaten our luncheon while waiting. A dog that knows not when to stop is as bad as one that will not go.

Strangely, the trail has taken a sudden liking for level stretches of timbered plateaus alongside the river. Occasionally we drop down and cross to the other side. The dogs here at an elevation of seven hundred feet jumped a pig, and two boys with "Tepes" and the third with the shotgun have taken to the chase. The baying is frequently discernible, but not signifying at bay yet, nor have I heard a shot. In the meantime, I am being assailed by countless hordes of mosquitoes of the typical convict-striped Tahitian variety.

Calling for doves has had no result, unless that was what brought a hawk overhead. Sucking sounds brought a kingfisher fairly close but not within range. Other than that "Nono" has absolute control of everything. Ruro,--there's a pair of them,--trills his merry notes at me.

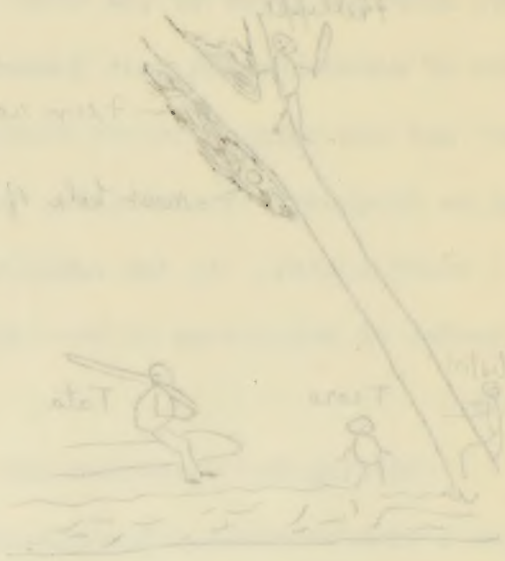
3:30 P. M. Bar. 28.56 inches. Elev. 830 feet.

But the Ruro was not following my call, for we had stopped near her nest. It is indeed an ill pig that brings no one good. When the boys returned, I took the gun; there were three Ruros wanting to go to New York. Then a fourth appeared with food for her, or his, "pickaninnies". The food was an Uro, or prawn, as evidenced by one leg left in her bill for the autopsy. I had the youngest boy climb the tree to find out what the nest contained, but he was unable to reach it. I climbed up, and by fastening my belt around the tree and holding thereto, succeeded in reaching around beneath the fern roots and into the nest, after enlarging the entrance with the "Tipie". Found it occupied by two little downless Ruro with their eyes not yet opened. Their bodies, not figuring the abdominal portion, were about the size of the average canary body. Of course, they were all mouth and stomach, as young birds should be.



The cartoons greatly amused the native boys.

An unwary green dove came within long range at this same place, where I had been calling them prior to the return of the boys from their unsuccessful boar chase. After a brief walk through this wood, we again crossed the river, and, ascending a small creek entering from



the east, soon arrived at an enormous overhanging boulder. In the shelter of that rock is a bed frame quite ample for the four of us, and room to spare. Found upon unpacking that the oldest fellow had let the ammunition can take water at one of the fords, for which there was no occasion, since I had not been wet to the hips all day. Spread everything to dry after storming about a bit. Then set to work at Otu, while one native tended the fire and rice, and the other two went to hunt Pua. How surprising to see them return two hours later with a perfect sized "veal" Pua, one shoulder of which went most deliciously for dinner in spite of bodily heat, rigor mortis, and other supposedly formidable obstacles to eating freshly killed meat. The rest of him hangs beneath a lemon tree awaiting tomorrow and baking in the Tahiti style. This will so greatly extend the grub supply that I might keep one man a week longer digging for Nohua. They still affirm that Nohua are quite plentiful about Vaihiria. I hope the offer of one franc each will prove tempting enough to satisfy the boys for several days.

As for me, I am not going back without trying various localities, to see if I can hear the birds at night by moving camp nearer their direction,--perhaps sleeping amongst their nests,--and digging out every habitable appearing abode. This expedition has cost so much, and the results are so scanty,--but four birds per day and nothing out of the ordinary except the nesting note on Ruro and two decidedly young plumaged herons,--that some drastic action must be taken. Unless well satisfied with what I find this week,--and I can hardly expect to be now,--I shall send the two brothers to Mataiea with birds and bus fare to Papeete, where they can carry a note to Mr. Beck, and thence return to their home.

The other fellow and I will exhaust our food supply before returning unsuccessfully. How great it would be to pull in two days before Christmas with enough birds to keep Mr. Beck busy a whole day!

December 15

Five good hours of restful sleep makes quite a different man of a fellow. I wonder if it is the mere fact of sleeping upon a bedstead,--heavens knows that it is not a bit softer than the rocky floor of the other cave.

This boulder, like the walls of the lower cave, is composed of volcanic conglomerate, the matrix being of a coarse volcanic nature and including everything from boulders twice the size of a man's head to coarse sand. A heavy shower drives very noisily through the broad Hibiscus leaves which are very plentiful about here.

Along the day's route yesterday we passed some very interesting geology. There was a series of stratified formations consisting of lava from one-half to three or four feet in thickness interspersed between layers of a very hard crystalline rock, apparently of a shaly nature metamorphosed by the heat from the lava flows, or intrusions. In several places it was quite slaty, and chipped off easily. Also found larger boulders of sandstone, and at this last ford an enormous boulder of granite that would weigh thirty tons or more. The strata mentioned above had a dip of about eighty degrees, and a strike about ten degrees from the river course.

Last evening, after having celebrated the killing of the fatted calf in a most prodigal and primitive manner by gorging to satiety upon the tasteful veal, we spent fully an hour holding a

concert. The main performers were the trio of natives, with me just performing enough to keep them going. I fully enjoy their songs, the soft vowel ending syllables being capable of considerable melody. Their tunes are all of a "jazzy" nature, and augmented often with hand-clapping and a deep chesty grunt decidedly like the rumbling accompaniment the Requa Indians give to their gambling tom-tom music. It is a very slight thing, but, strangely, the second similarity noted between American Indians and Polynesians; the other is the strange custom of tattooing the lower lip and chin by married women.

This chest-grunt is somewhat of a bass part to the songs, but is more accurately purely a jazz element. As such, it is quite effective and carries a good distance. It has, however, neither tune nor harmony, any more than a bass drum, being merely a time beat. Another method is to use one large and one small splinter of bamboo, fixed so they will flip noisily together, and held against the teeth by the left hand, while the index finger of the right does the flipping. A continuous rattle of the smaller stick against the larger, accompanied by a regular, deeper pitched beat of the larger against the teeth, while the mouth, of course, forms the air column for vibrating effects.

The third implement of our jazz orchestra was a tin hardtack can, beat upon very cleverly by two splinters of bamboo. My share of the program was to do the "Hula Hula", until the bamboo slats of the bed began to break beneath my light (?) toes. I don't know what I looked like, but my shadow, enormously magnified and thrown upon the trees before the cave, was decidedly ludicrous and anything but graceful or clever. But it served its purpose fully as well as a good dancer might have done, for it gained the familiarity

of the boys, and kept them going with their interesting amusement.

My one and only yodeling tune, a bar or two varied nearly every time rendered, continues to amuse them immensely. "Yale-a-Boola" they have picked up quickly, and they say they started something in Popenoo with it the night of the "jamboree".----- I have been dropping off to sleep, and waking again to write another line for two hours; perhaps I can get another wink before daylight arouses us to the delightful task of roasting veal à la Tahiti.

We would hesitate to kill a calf in America for fear of the meat spoiling, but these fellows in their hot and damp climate kill pigs, goats, and cattle without hesitation. By cooking it in their native style, stuffing the meat into bamboo tubes, and again cooking it, they have a canned beef, or pork, or mutton par excellence; and it keeps, or at least would keep, if they gave it half a chance. Four of us last evening,--and I ate my share,--cleaned up a full shoulder of this two hundred pound calf. Incidentally, they tell me not to mention calf in Papeete, since all the cattle here belong to some one man. What a crime, that one man can turn loose half a dozen cows, and, without touching them, can reap all the profits of their reproduction and growth upon the resources of the island. It may not be law, but certainly equity gives these down-trodden natives full justification to kill the beef and eat it. One might as well claim all the pigs in the island. If Captain Cook left the first pair here, why don't his heirs come forth and reap a glorious harvest by charging the natives for hunting?

I am not inclined to take from any man honestly earned wealth, but such undeserved, and certainly unearned, increment as this is, should not be the property of any man. Why do not the

natives turn loose half a dozen cows, then where would he be? He would have to come in here and brand his cattle, and that would put an end to this fear of mentioning "Veal cutlets" in Papeete. Such a monopoly of natural resources we call big business, when it is nothing more than highway robbery. Well, I'll play Robin Hood and do a little justifiable poaching myself, or at least loan the boys the shotgun for the purpose. There is no law that can starve a man who is nervy enough to obtain food. It may punish him for the act later on, but it cannot prevent him from eating.

I inquired of the Chief if shooting these cattle was permissible, and from all I could gather, it was at least commonly done. I guess the original owner of the escaped milch cow would have a hard job prosecuting, even under French lack of laws. Well, all evidence will disappear in a very few meals, for we rival the hounds at mess.

Pua , the calf, went into "Rapo" (?) Vol. 7, p. 793 after being thoroughly washed. I used the camera freely and hope to get illustrations of the important moves, from the glowing lava boulders to the finished roast veal.

The rocks being well heated by the squarely built wood-fire within them, all the smouldering embers were removed. With two shoulder poles, two of the men stirred and tamped the hot boulders into a firm flat mass in the hollow they occupied. Upon these white hot, and therefore strictly clean, rocks the quartered calf was placed. The meat was covered by a thick layer of the broad leaves of the Hibiscus tree. Then the black humus, relic of many a former oven, immediately surrounding the place was raked by the five-tined rakes nature gave to all men over the leaf-covered oven. The rakes were also used to press the covering dirt and rubbish down firmly. It was not the artistic and neat appearing job that Tafai

made of Pua the pig in the Punaruu. ? Bk. 7, p. 794

Nevertheless, six hours later when the oven was opened it gave forth an aroma of roast veal like I never before smelled, and the taste was most appetizing. I hope rainy weather keeps away the prickly heat, because caution as to proteins never will, with me.

The boys have a great time packing the meat into the sections of bamboo, because a goodly portion of it and all the scraps go down into the food storehouse Mother Nature gave them; while the three hungry hounds sit impatiently around, waiting for each bone to be discarded,--their well-earned share which hardly amounts to decent interest. Yet they enjoy the chase, I believe, quite as much as man himself.

What a wonderful thing our ancient ancestor, likewise a dweller 'neath overhanging cliffs and boulders, did when he carried to his domicile the captured puppies of the wolf. There he had found the most useful animal in the world to one depending upon his hunting skill for food. He, too, held many a rib of beef in his greasy fingers, and smacked his still more grease-besmeared chops over the dainty morsel, tossing the remnants to his faithful wolf pup, now grown to useful doghood. He, too, no doubt, gorged to satiety upon a diet far too strong with proteins, and he had no dyspepsia tablets to take after each meal, nor knew aught of indigestion, I'll wager.

What I am interested in is just how far in towards the Malayan Peninsula this Tahitian method of cooking meat and vegetables is prevalent. Where was it developed, and how early in the prehistoric history of these people? The beds of rocks would be quite characteristic relics in cave excavations. I wonder if old

Pithicanthropus or his immediate descendants had intelligence enough to develop such a scheme. We who are such slaves to pots and pans and knives and forks certainly are handicapped when it comes to camping out.

Our ten canes of roast veal are now being capped by the broad leaves of hibiscus, the most useful tree that grows in Tahiti, and used for everything, from firewood to canoe. Nor do these boys waste many matches to kindle a fire. If they can find one hot ember they will blow it into a glow, and from that will soon have a handful of charcoal burning, for hibiscus wood leaves charcoal and smouldering embers long after the fire is out; then small pieces or shavings are soon kindled.

I measured the bamboo canes, and found that they would about average five cm. in diameter inside measurement, and sixty-five cm. in length.

27.5 cm. = bamboo in rough balance.

56 cm. = 1.5 pound tin beef.

56: 27.5 = X : 1.5

27.5 X = 84.0

X = 3.00 pounds per one cane bamboo.

So we have approximately thirty pounds more of proteins to add to our stock of provisions.

Tata has agreed to return with me from Mataiea to Vahiria for another week if we find the birds worth the effort. Went out this afternoon, but soon decided that the time was wasted, since all the birds were seeking shelter from the heavy rain. Teoro and Phillippe wanting to go farther, I gave them gun and ammunition. They returned

at four o'clock, "Ite Manu", but had a long story to tell about having found a Nohua burrow, but that it was "Mero" long, and went into, or at least beneath, "Owaite" rocks. Well, if they have found them this low, we certainly should find them plentiful higher up. By using a little judgment, and digging only where fresh signs are evident, we should find plenty above. They certainly talk assuredly of finding plenty. Their packing beef into the bamboo has solved my worries about not being able to preserve bodies of young and old birds. A section of bamboo with another of greater size and length that will fit snugly over the first will do for carrying formalin solution and pickled specimens.

We were fortunate to have the veal to roast and "Bamboo" today, for it necessitated remaining in camp, which is about as dry as a man could desire. Lucky to have a large boulder overhead when the rain descends as it did today! The rivers are again raging torrents, but, as we are ascending the small creek coming down from the south-eastward, there will be little difficulty in that respect tomorrow, when we should reach Nohua territory on the ridge we ascend to cross the divide. Up there we will camp well away from noisy water, and should hear whether or not Nohua is plentiful. The rain has changed into fog, which should mean that the deluge is over and fair weather should result tomorrow. Let us pray! Orohena should be visible from here, and probably is, barring the Na and fog.

6:00 P. M. Bar. 28.64 inches. Apparently, I neglected to record its registration upon arriving here, the last record being at Ruro's house, from which bench we descended perhaps twenty or thirty feet to the river, but I believe we have climbed as high since.

At last I have discovered the cause of the itching in that insect, second only to one that crawls, the flea, an insect which came into the life of man when the wolf puppies were brought into his cave, and have been with all dogs and dog owners (lap poodles excepted) ever since.

After sewing bamboo stays in a paraffined sack to make a carrying case for the Otu and any other possible bird too long for the baskets, I slept three hours. More than that, however, was not to be thought of after a day's feasting upon roast veal, and especially when the boys made pancakes for dinner this evening. Had a little amusement when I tried to show off by flipping them from the frying pan around behind me and up over my left shoulder. After two failures, succeeded twice. Of course, it was easy to toss them up under either leg and catch them securely in the griddle. Tried to get Teoro to try the stunts, but he was too cautious.

December 16

It has sounded decidedly stormy all night and the rivers are very noisy now, but rain or no, we move Nohua-ward this morning. The wind is so variable in direction that constant adjusting of the shield is necessary to keep the candle burning brightly. It's a mighty good thing I brought a dozen of them along, for they certainly help spend the eleven hours of darkness that we have even during these longest days of a southern summer. Edison was right when he said that his incandescent light had added six hours of usefulness to each day, for without light, mankind would have to sleep all through the long night. No doubt we did when in that stage of our progress which corresponded with the present stage of the Polyne-

sians. They seem to enjoy sleeping all the night and a good portion of the daytime. Of course if one has but to eat, and sleep, even daylight can become boresome.

The light problem is well solved in the form of a tin oil can, converted ingeniously into a charcoal stove by a fire hole, or hearth, being cut into one side. The candle in there is safe from all winds and burns very steadily, while sufficient light comes out the open hearth to write by. Furthermore, my eyes are shaded by the tin,--a very desirable result.

It is six hours since fire was in that box, and yet there is a smouldering ember of hibiscus in it. Verily, that is a most persistent wood, thoroughly intent upon burning to the last atom of carbon. It could be used in furnaces, and by a little banking at night, would require but stirring in the morning to commence its very heated burning.

How quickly the mosquitoes discover any exposed anatomy! How diligently fleas carry on their subsartorial operations! Even with such evident facts of proof, how many people there are that fail to realize the great law of ecology,--eat and don't be eaten!

In a small hole in the shelter of this rock, in fact, in the rock itself, where perhaps some destructible wood was encased, or a large gas bubble formed in the lava, are four lizard eggs, exceedingly large for the little creatures which evidently must have laid them. Suspended in some miraculous manner in a hollow, higher in the rock, are six and two in different groups, of another size and very likely the eggs of a different species of lizard. How does it happen that reptiles are present here and no amphibians? Or mammals? Reptiles and ground birds, but no higher forms of animals--drat that indefatigable, non-satisfiable flea, which has

dwelt and drilled persistently upon my left leg throughout this journey! ------ Crustacea were well developed here, and I do not think came from other islands across stretches of ocean.

These islands certainly offer a splendid study of geographical distribution,--a very heavy down pouring of rain is passing over,--and a thorough scientific survey would reveal further evidence of their relationship to one another. If this shower persists, or many more like it come after daylight, I may yet have the boys lead me to where they thought they found a Nohua burrow, and leave our equipment here where it is good and dry. Christmas is nine days off yet, and as long as I can keep these men earning their wages, I guess the Museum will be willing to pay them. If Nohua can be found here and the equipment kept dry, why go forth to swim through the jungle as well as the rivers? I may not even go in for Christmas, unless I find at least one shearwater. In fact, I'll certainly hate to go in at all without one dozen, at least. The bounty on that flea's head has raised to ten cents, French money, of course.

BOOK VIII

Tahiti

Upper Popenoo
Vahiria
Maara
Papeete--Christmas

Dec. 16--Dec. 31, 1920

December 16

With rain still falling in good heavy torrents, the decision this morning is to shove ahead and search for Nohua where the boys found the one, returning to camp here for the night, where everything will remain dry, at least. Will not even attempt to reach Mataieo this Saturday now, but will spend the week-end with Nohua.

We delayed for a couple of extra heavy showers before leaving in search of Nohua. The place the boys supposed to be a nest is but a hole beneath a huge rock, into which I could see no signs of tracks. It certainly was not a burrow. Being at the low altitude of 1350 feet, I doubt the presence of Nohua at all on this ridge. We have crossed it and are descending into the valley, whence flows the stream by our rock-house.

Here came across a pair of kingfishers feeding young, and another pair nesting. Collected the latter. Later, found a dark-

phased female, very similar to the one brought in two days ago by the boys from same neighborhood. Nothing further occurred until in camp, whence I shot two swallows across the stream in some bamboo.

The main event of the day was Tato's declaring he would not leave this shelter tomorrow if it were raining. He lay on the bed and slept most of today. In fact, he assumes the role of straw boss over the other two lads who do all the work. I had no business paying him in full at the beginning,--it gave him the whip hand. But the other fellows have agreed to go ahead with me in spite of everything, so if he is still obstinate tomorrow, I'll go on without him. The trouble with him is, as before, so much delay within an easy day's trip of Popenoo, and now Sunday being nearer than the last one, he is thinking of running down there to say his morning prayers. Well, he can go, but I'll do my best to tell him what I think of a quitter and cheat, for, having received his hire, he has failed to earn it. The other boys seem to be excellent fellows. I think our load is light enough for two after this week of shooting away heavy cartridges, and eating, although the beef is well balanced with the veal. But by carrying my own share we can, I think, get along well enough without him. Even if he does go, I may dismiss him at the summit; he should at least have to help us up there.

December 17

But we may not have any trouble whatever, for when I awoke the stars were shining, and the eaves had ceased their dripping. A shower just passed over, but I hope it won't last and that the morning will come clear and resplendent to cheer up the boys.

Few people ever have the opportunity of beholding such wonderful tropical showers as I have seen these past two weeks. They are rather disastrous to our work, but nevertheless in themselves, they are marvelous. Straight sunshiny scenery, no matter how beautiful, can get monotonous, but there is always a difference and an interesting one about rain. Each shower seems to possess individuality. I like these vigorous deluges, even if I happen to be out in them, for they seem to symbolize energetic ambition, appear to be bound to get something wet; while a slow drizzling rainstorm seems lazy and indifferent.

7:15 A. M. Bar. 28.65 inches. Elev. 750. Rain and clouds.

9:00 A. M. Bar. 28.60 inches. Elev. 770.

We left, and crossing the creek, ascended a ridge abruptly to 930 feet. Then we descended again into the next valley, where the trail became very indistinct. Hearing two pigs in animated conversation at some distance, the boys have gone after them, but I fear they are too far. The only trouble, of course, is further delay of at least one day if they bag one. Tato came without any further objections this morning, the other boys having agreed to go on without him if necessary, and I went ahead with preparations first thing, not even asking him.

The next stop was a little farther along the side of the valley, into which we dropped where a sharp ravine cuts down the slope. Here the boys are somewhat at a loss as to the trail.

At a second ravine,--and a second scent of Pua after which the men are now gone,--the Barometer at 10:15 reads 28.25 inches, elevation 1100 feet. Four swallows detracted our attention a little while, but would not come within auxiliary cartridge range.

A hawk is calling from out over the valley. The old dog left us awhile back and just now came up on our tracks, but seeing me, departed again to the rearward.

The ridge between us and Vahiria, which should be the habitat of Nohua, is in sight. I cannot see how Peale ever imagined it six thousand feet high. It will do well if it gets above three. Of course, he might not have realized how little elevation he gained while on the main Popenoo river where the trail leaves it at less than eight hundred feet. The hunters return minus the pig.

Tree ferns commenced just after crossing the creek this morning and have been very thick ever since. Guava is very thick throughout this valley but lantana, thank heaven, is an unknown thing so far. Ferns already dominate the jungle.

We were on a false trail and had to descend considerably on the back trail before crossing the ravine to a low cave, where were two swallow nests, one containing an egg. While I was cutting a ladder, the natives reached up and pulled down the nest. In it was one egg, and despite my warnings they dropped and broke that. The nests were similar to those found down the river and considered swift nests. They were made of dead moss stuck to the rocks by mud, very little being used. One is fully 45 cm. long, and rests upon a triangular ridge of rock and extends upward to an over-jutting piece which forms a perfect shelter. How much reasoning power is shown by such building? Have been unable to get the old bird. The egg was about one centimeter in length, and spotted irregularly with brownish gray spots. Quite a shower of rain is falling now, after which we will go on to the next camp.

11:00 A. M. Barometer 28.40 inches. Elevation 950 feet.

Apparently, we have climbing ahead of us to the next house, where we will stop. Had I known of these places, we would have come on here yesterday at least, but Tato said, "Ite house", unreliable guide that he is!

We climbed up stream to an altitude of 1250 feet, where we found the most commodious "cave", or rather, shelter yet occupied. It is an enormous boulder of the same volcanic conglomerate as the others, and held aloft by smaller ones, with free air circulating through it. There is room for a dozen men if necessary. Incidentally, it has rained quite as much today as it did yesterday, but, with this shelter to come to, we were not hurt in the least by the thorough drenching we got. We might just as well have come here yesterday afternoon, and would have now been trying to keep dry beneath two very small pieces of leaking canvas. At this cave found a pair of swallows with well-feathered young, one of which flew away out of sight when I poked the nest down. Have three now to work upon this afternoon,--good practice, no doubt, but very exasperating to get such awful results.

2:30 P. M. Barometer 28.08 inches. Elevation 1260 feet.

At last the boys have shown the proper spirit,--the hike in the rain no doubt did them good,--for this afternoon they went out after Fei. I had them take the gun along, and well it was, for they brought back a green heron, still a scarce bird in our collections. Skinned him by light of candles, succeeding, in a manner, in getting the thin swallows done before dark. How splendid the Fei tasted! Any starch no doubt would, after ten days of almost wholly proteins,--meat, beans, and rice.

December 18

Enter Fate this morning via a very severe stomach ache on the part of our youngest boy, Phillippe. Poor fellow, I gave him a heavy dose of castor oil, but had to take some myself to prove it not poisonous. The boys agreed to go ahead tomorrow if we stay here today, but if we get enough birds to keep good and busy, it may not be necessary to so violate the Sabbath. In checking up the time, these boys have, at the very best, given me but four full days of work, the rest of the time being spent in leisure, for which I will not feel at all duty bound to pay them. The day they cooked beef, for instance; the days they occupied waiting for the "Hulla lula"; and this sick man's day: all are procrastinations of time for which they certainly deserve no remuneration. The twenty dollars, kiki, and stage ride should be plenty, and is what I shall offer them.

Surely Fate seems determined that Nohua shall not be found by us this fall. However, it is as interesting combating Fate as it is armies. Rain seems to be Fate's best ally in the tropics, as frost is in the polar regions. Heat does not seem to bother so much as rain; well, perhaps it does around the shoreline in making people insipid and indolent; but in the interior, the rain by swelling rivers, making slippery trails, and loosening treacherous rocks, is the element used for nature to bar human attempts to scale mountains or find the inevitable Nohua.

Our fresh beef supply has now dwindled one-half, but, with the advent of the Fei into our diet, all promises are for the best and less sickness. American beans do not go well with tropical natives.

In referring to the map, I am at a loss as to our exact

location. If the rivers are correctly sized on it, and the hasheres are reliable, then we are still a good distance from the lake. A swallow just flew through the cave. How marvelously rapid their eyesight must be to accommodate such swift action as their flight through tree branches and caves!

Pebbles in the great conglomerate boulder above us are very similar to the kind now found down the valley of the Popenoo. Lavas predominate, but granites and a bluish clayish rock, altered of course, are encased. The matrix appears to be a volcanic ash, or sand; some of the pebbles show considerable smoothing by water action prior to being encased. Somewhere on this island there should be fossil trees, or else this volcanic action must have preceded all growth of hard fibred vegetation, which would have given the rivers time to have leveled down the mountains much more than they have. Of course, there are no resiny trees to be preserved, but certainly some slight portions of the others being covered by volcanic out-bursts would be fossilized.

Spent most of the day overhauling the birds, because the two boys who went after Fei,--I thought they would take two hours as they did yesterday,--remained out all day. Returning to camp, they brought in but two Manu, an Otu killed just before arriving here, and a black warbler (?), as nearly as I can make out. It is quite distinct from the other birds in size and color. He is not merely a melanistic phase of the other. He has a shorter and broader bill (is himself shorter and chunkier), and the bill is of a light slaty blue color, as is the inside of his mouth and his tongue, also his shins. His feet, however, are slightly darker blue. The

plumage is entirely jet black; eyes dark brown. A male with somewhat swollen sexual organs. Tata says there was another, but he could not get him. We will spend at least an hour in that neighborhood tomorrow, perhaps lunching there, or if it be near the summit of the ridge, I might remain there for the night, as well to listen for Nohua. That is where I should now have been, had I gone out with the men this morning, but I did not expect them to go so far. You never can tell what these natives might not do.

Made a fairly good skin of him, and a very good one, except an eye, of Otu. One of the three Otus formerly mounted is in a bad condition. He was rather soiled when brought in, but being a young bird of a desirable plumage phase, I tried to wash him and make a skin of him. He is now, however, at a rather offensive stage of decomposition, due to the work of fly larvae and bacteria on the cords of his shins where the arsenic did not get.

For awhile this morning when the men failed to return, I became quite peeved at myself for not having gone out. But when the sun came out bright and clear and very hot, I opened up the birds and spread them out to dry, a very necessary and timely job. Then having worked three hours this evening makes up for what time was lost, especially so when we intend to hike tomorrow, which day is Sunday. I proposed going ahead myself and camping on the ridge, but the young lad, who must be feeling better, spoke up and said everybody would go ahead tomorrow.

The Fei they brought back from the ridge looking down upon Vaihiria certainly are delicious. That will form the main part of our diet henceforth.

I listened for Nohua tonight, but the creek is altogether

too noisy. The boys, however, are still full of assurance, and seemed to see great wealth when I reinformed them that each Nohua meant a franc to the man who produced it. May they make a cinq-franc each for three days! But why wish for such luck, when the finding of one or two will fill our hearts with untold joy and exhilaration? I am already very highly pleased with the black warbler, and will certainly try to get enough specimens of it to justify any scientific conclusions the Museum Laboratory students may reach. They are welcome to that phase of the work. Although interesting enough, it is not to be compared with this phase.

I, for one, would rather be here in this flea-infested cavern, with the moon and stars trying seriously to shine through the gathering mist above, with the babbling brook, so loquacious it drowns all other noises of the night, and with the unlimited anticipation of what tomorrow will bring; I would rather be here than to be systematic authority on any line of science.

December 19

7:00 A. M. Barometer 28.12 inches. Elevation 1225 feet. A beautifully clear morning, and we are all prepared to move ahead following "kiki". Delayed long enough to tie camera to a tree and try two pictures of us at mouth of cave.

Leaving camp at eight-thirty, we ascended that side of creek a short ways, then crossed over and went directly up the steep shoulder between that stream and the waterfall south of it. A few clouds are hanging around mountain summits, as is only to be expected. We are "blowing" a spell now.

9:00 A. M. Barometer 27:69 inches. Elevation 1600+ ft.

too noisy. The boys, however, are still full of nonsense, and seemed to see great wealth when I reinforced them that each Indian meant a franc to the man who produced it. May they make a cinq-franc each for three days! But why wait for such luck, when the finding of one or two will fill our hearts with untold joy and exhilaration? I am already very highly pleased with the black waterier, and will certainly try to get enough specimens of it to justify any scientific conclusions the Museum Laboratory students may reach. They are welcome to that phase of the work. Although interesting enough, it is not to be compared with this phase.

I, for one, would rather be here in this fine-forested cavern, with the moon and stars trying serviously to shine through the gathering mist above, with the babbling brook, so loquacious it drowns all other noises of the night, and with the unlimited anticipation of what tomorrow will bring; I would rather be here than to be systematic authority on any line of science.

December 19

7:00 A. M. Barometer 28.12 inches. Elevation 1250 feet. A beautifully clear morning, and we are all prepared to move ahead following "Niki". Delayed long enough to tie camera to a tree and try two pictures of us at mouth of cave.

Leaving camp at eight-thirty, we ascended that side of creek a short ways, then crossed over and went directly up the steep shoulder between that stream and the waterfall south of it. A few clouds are hanging around mountain summits, as is only to be expected. We are "plowing" a spell now.

9:00 A. M. Barometer 27.99 inches. Elevation 1500+ ft.

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Bk 8
p. 852

Tree ferns, ——, lemons and oranges predominate vegetation. It is going to be an extremely hot day, from all prospects. I expect to pay dearly in heat prickles on my back for the excess of proteins I have eaten. Am dieting to a certain extent upon Fei and flour and sugar now, with the latter nearly gone. Plan on reaching Mataiea, or if a trail lead that way, Papearie Wednesday, giving us Thursday to reach Papeete by stage.

9:45 A. M. Barometer 27.16 inches. Elevation 2115 feet. Ascended shoulder to a comparatively flat place, where we have just crossed the stream forming the beautiful waterfall on our right, coming up. It is the last water we see until we get across the divide. A good sweltering hot day ahead, but it has one compensation,--there will be a clear view of the island, for, from all present prospects, we will not get as high as the cloud banks.

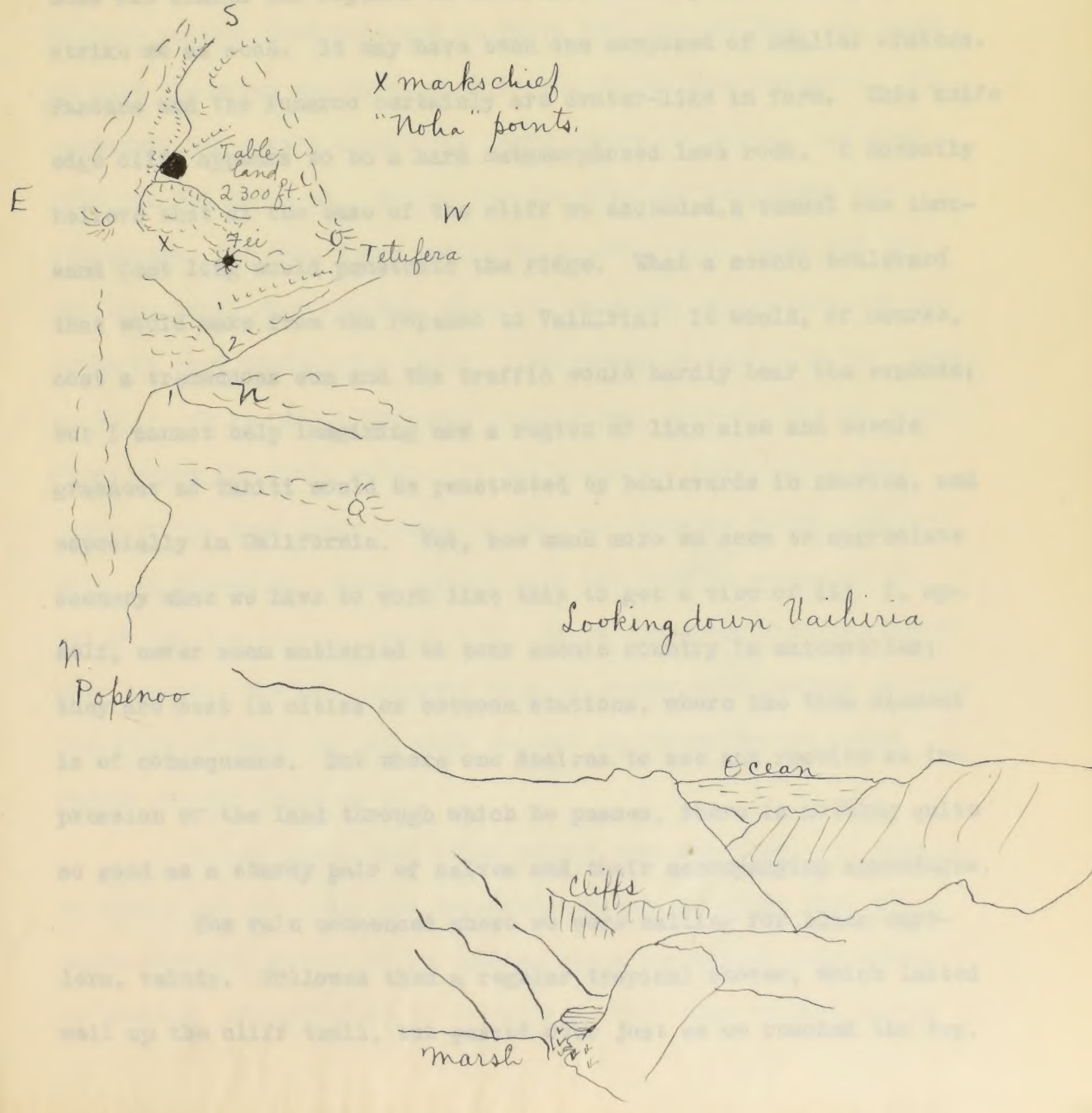
Every now and then I call for "Manu" with, as yet, no results. How anxious I am to get among those black warblers and secure at least one or two more specimens! What is the female like, and the young birds? The one specimen appeared to be a summer breeder, either past or entering the season. How I should like to make a thorough collection of them! Can I do it, and also do justice to Nohua in these three remaining days before we take the trail for the sea coast south of the island? If the men prove good diggers, I can; but if I have to get out the second day and dig Nohua, and spend the night caring for them, I'll have about all I can do. There are also hopes of Rupi in the Feis.

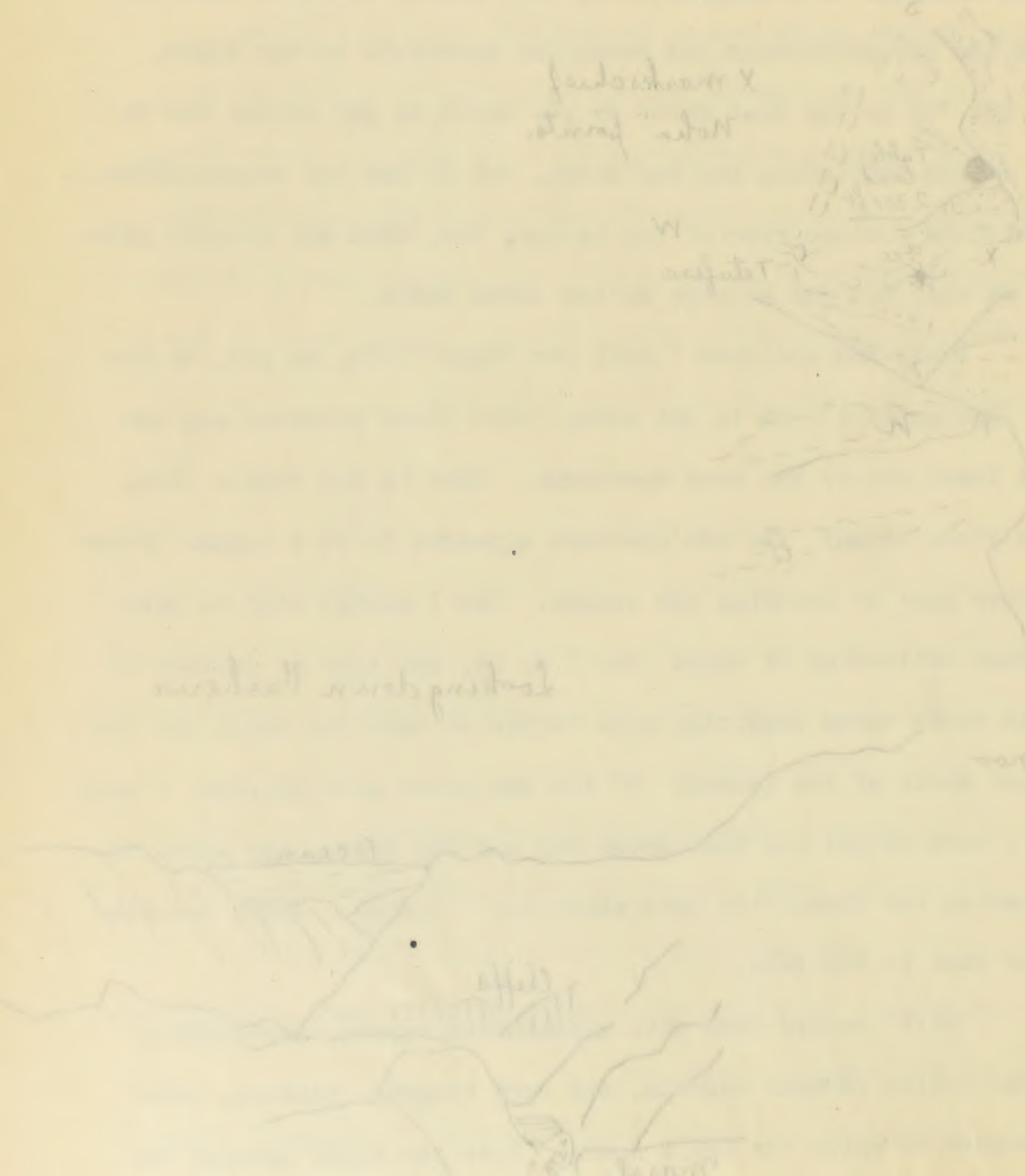
"Piti" equals tree with walnut-like leaves, low-growing branches, yellow tubular corolla, and very fragrant flowers, under the branches of which the trail ducks. Here the black warbler was

taken yesterday. None observed after several minutes of calling by various methods. Perhaps clouds and rain, which is just commencing, may be the difficulty. Let us hope for more further on or next trip. On to Nohua! Elevation 2150 feet.

Summit of knife ridge between Popenoo and Vaihiria.

Barometer 26.40 inches. Elevation rdg. 2750 feet. Peale certainly over-estimated his elevation here; even the mountain west of here is but 5850 feet high. Did Peale climb either it or the one east of here?





That last seven hundred feet was steeper than the climb from the Punaruu river up to the plateau, though not so long. Often I was able to stand perfectly vertically and touch the cliff by holding out my arm extended horizontally, and other times it was like climbing up a ladder almost vertically. What a hard-baked ridge this must be, continuing from Rouge Pie to the Diadime, thence to Aorai, Orohena, Telufara, and here and on to the next. The Valley of the Vaihiria appears from here much less crater-like than the Punaroo. Some one claims the Popenoo to be a vast crater, but it does not strike me as such. It may have been one composed of smaller craters. Fantana and the Punaroo certainly are crater-like in form. This knife edge cliff appears to be a hard matamorphosed lava rock. I honestly believe that at the base of the cliff we ascended,a tunnel one thousand feet long would penetrate the ridge. What a scenic boulevard that would make from the Popenoo to Vaihiria! It would, of course, cost a tremendous sum and the traffic would hardly bear the expense; but I cannot help imagining how a region of like size and scenic grandeur as Tahiti would be penetrated by boulevards in America, and especially in California. Yet, how much more we seem to appreciate scenery when we have to work like this to get a view of it! I, myself, never seem satisfied to tour scenic country in automobiles; they are best in cities or between stations, where the time element is of consequence. But where one desires to see and receive an impression of the land through which he passes, there is nothing quite so good as a sturdy pair of calves and their accompanying appendages.

The rain commenced where we were calling for black warblers, vainly. Followed then a regular tropical shower, which lasted well up the cliff trail, but passed over just as we reached the top.

This was merely to give us a chance to view the two opposite valleys, and take a few pictures, for we had barely finished our kiki when the Na commenced again, and since then, it has been raining cats, dogs, pitchforks, and all the other proverbial exaggerations.

While I sketched the valley ahead, the boys shoved in a short distance to where Jimmy Hall camped, and when I arrived there I found them digging at a supposed Nohua hole, but I have my doubts. I went along the ridge almost to the base of Telufara without finding the least prospect of a hole. Started the other direction, but hearing another bird returned to where Tato was building our house. He said the noise was Ruro, with accent on the last syllable. It certainly was a call I have not heard before in Tahiti, and came from the Fei below us. Having let the boys who went ahead for "Pape" take the gun, I was unable to go after him. They did not get back until four o'clock, when the rain was quite heavy and no sound of bird coming from below, I continued to help with the "Fare no Fei." It is only a half-cast native hut, nowever, for my tent-floor forms the front eaves. It was quite wet here, but a good layer of the dead lower leaves of the Fei makes it fairly comfortable. I shared my lower blanket with the boys by spreading it out on top the leaves. Well, I'll try to get along with the heavy army blanket, but will no doubt find it rather cool towards morning. Certainly if there be any wind, we here on this elevated ridge should get our share of it.

I just asked Tato if he didn't ever run down. Of course, he didn't get the joke, but strangely enough the other boys did. Especially did they enjoy my calling him a phonograph that needed no winding. He certainly is loquacious, the other fellows hardly

ever getting a word into the conversation. Well, I should have boiled my bedding, pajamas, and myself too perhaps, for it seems that I have brought a good stock of fleas from the caves.

Being unsuccessful in my four hours of searching for the invisible "Nohua" along this ridge, I have decided that unless we hear the birds tonight it will be futile to waste time along here where the tangled growth is certainly not promising. Why did Peale not leave a record of where he found the birds? If he had climbed the mountains on either side he certainly should not have called them the ridge between Popenoo and Vaihiria. Is it possible that he followed a different trail?

There just came to my mind a point in the trail up the cliff I intended to describe. A landslide has occurred there not very long since, and twenty feet or so of the trail slipped away with it. It lodged some fifty feet below,where the vegetation temporarily supports it. Too bad it could not have waited a few days until we came along, for a man's weight might have been sufficient to start it, and it was so slight it would but have scared him a little. I had roots break with me twice today, and the feeling was quite uncanny. It was also amusing to be scrambling along in the vegetation above the knife edge at places a meter or less in width, with a very steep slope on the one hand, and an invisible jump-off on the other. Below the jump-off grow an enormous field of Feis. When the pitchforks (I think they sound heavier than cats and dogs) were falling from the over-saturated clouds, the reverberating patter of the drops upon the broad leaves was extremely noisy. We went without that delicacy (?), Fei, tonight because of the rain, and everyone was anxious to get into dry clothes and un-

der cover. So we "kikied beef, beans, and hard-tack, and the last can of jam".

8:00 P. M. Still raining; not a sound from Nohua. I laid awake until nine o'clock, hearing not a whimper nor whine from that bane (?) of our searches, Nohua. Then I dropped off to sleep for a little while, but not long before the chilly winds from the north came up the Popenoo, slid over this ridge, and under and through our house, and on to the valley of Vaihiria. So, bitterly disappointed, I suppose I'll have to go on and face the music of defeat.

I have been wondering why Tata has persistently carried his army shortcoat with him on these trips; but now I know the reason, for he informs me that when he and Hall camped at this same place it was "plenty toto". I performed a little strategy when I discovered that he had it, not on, but under him. Pulled it out from beneath and put it on, amidst wild exclamations from the boys. After they had their fun, I spread the heavy army blanket over them. That smothered all objections, and now they are dropping off--this precipitate ridge--precipitately into slumberland. It is three o'clock, and as for me, I am going to listen intently for Nohua this morning. If I could but hear the faintest suggestion of his royal presence, for he seems to be sovereign of this expedition, and incidentally quite supreme, I believe I would lead the men after him. No Nohua nohow! Plenty Nono, however! Some very interesting moths have been attracted by the candle light also.

With all of my own dry clothes, including underwear, pajamas, shirt, trousers, socks, and sweater, and Tata's heavy military coat, by tucking my legs beneath the army blanket I can just manage to keep comfortable. This is a condition I never dreamed

of within the tropics, and less than three thousand feet high. Why did the hotel Fantana fail? Certainly it should have been a considerable attraction to tourists anxious for a cooling off after ten hot days at sea. A road could be built there now with very little expense, for the old grade along the present trail is in very good shape. Certainly Americans would revive that at least. I wish someone in diplomatic circles would suggest that France turn these Society, Marquesan, and Tuamotu Islands over to America for payment of her war debt. No matter how many billions that may be, the commercial possibilities here would soon repay us for it; and since civilization has already driven the natives to, or even beyond, the wall, I'd rather see the best civilization here.

For more than half an hour a little moth, hardly 1.5 cm. in length, of the linear shape, has been perched calmly beside my watch facing the candle. I wonder what charms him the most, the ticking Ingersoll, or the flaring light. What a contrast to the little silvery, wide-spread winged fellow who just now appeared in wild exotic fluttering flight, and dashed blindly into the singing flame! The old proverb was well spoken about the moth and the candle and scorched wings. Alas, sad fate! A huge fellow came, scorched his wings slightly, lit beside little quiescent golden-back, disturbed the little fellow, and in the latter's flight from the former the flame of the candle did its worst. Now he lies with his fallen comrades in the sodden mass of melted wax in the tin can beneath the flame.

No red lettered day is this, but rather one of the blackest type, for it is with a heavy heart indeed, that I will proceed without a single specimen of Nohua. But already my ten days have

stretched to eleven, and will number fourteen ere we reach Papeete. The men, however, will have labored but one half of that time, so I shall pay them twenty dollars and bus fares, which amounts to more than three dollars a day.

Heaven forbid that this creature crawling toward me be that which in all appearances it is! With body flattened laterally and extended dorsally, with hopping rear legs, and a deep oxblood red in color, is this monster a flea? Heaven forbid! He does, for all the world, resemble one, but I think he is some harmless distant relative of the insect world. Such a flea would soon perish, and so fail to leave descendants to prove that Darwin's theory of Natural Selection, although it may not explain any purpose for things existing, at least offers a very feasible explanation of why some living creatures do exist and why others have perished. No one can deny that those beings, human and otherwise (men placed in whichever class they belong), which are best adapted to meet the exigencies of their environment are going to survive.

December 20

Today there is the bird heard below this cliff; possibilities of Rupi, and at the lake ducks. To hope for all of them is the privilege of the collector. To find one will be his good fortune. We have, however, for consolation of this trip, the black warbler, but will certainly have to come again to prove him a distinct species. It is actually chilly upon my hands, and so I'm going to try the snoring a little.

8:00 A. M. Barometer 26.49 inches. Elevation rdg. 2750 ft.

Spent morning trying to shoot swallows so they would drop on knife-ridge; also in gazing at surrounding cliffs for swifts and petrels. For the life of me, I cannot make out all that Peale reported. I find nothing along this ridge but opeia and amomoa, the hawk; nor have I been able to find any signs of birds about the cliffs in view from here. The bird I heard last evening has made no signs nor sounds this morning. No birds answered calling through Feis, or below. However, I am assured of an hour's work this evening on the opeia I killed from camp, one of the boys finding it in the Fei fifty feet or so below. I wonder where Peale went to shoot swifts that dropped "thousands of feet below".

Our camp was a rather unsuccessful one, as I rather expected from the youth of the guides. The only thing to do is to find out through Manu who in Popenoo or Tahiti knows best the habits of Nohua along here, and pay him his price for guiding us.

9:40 A. M. Barometer 26.10 in. Elevation 2550 feet. Have descended a talus slope of loose lava boulders, well over-grown with Fei,--the largest and densest patch I have yet seen. The slope is thirty degrees, or very close thereto. At this altitude Opui commences to take part in the vegetative program.

10:35 A. M. Barometer 27.19 inches. Elevation 2090 feet. The Opui and Feis belt extended down to a level, or nearly so, shelf, where the Fei were almost the only vegetation. There the boys stopped to gather some huge ones fully three inches in diameter, and nine or ten long. I hope they can find two bunches like those to take down to Maara, for I have promised them that we will all go from Mataiea to Maara if they will carry Feis down for the folks' Christmas present.

Am now at the edge of that shelf where the trail commences to drop into the gorge above Lake Vaihiria. Opposite, is the table-land which protrudes out into the valley and hides a portion of the lake from the view point above. I came on ahead to call for birds, and the men seem to be taking their time to get here, but are now arriving.

11:00 A. M. Barometer 27.67 inches. Elevation 1620 feet. The boys then came over 1100 feet down for water yesterday. No wonder that they were ready for bed when they returned! Nor was it any wonder that they found no Manu, for this morning has been ideal bird weather, and not a sign nor sound have I observed. May there be a few below! Geology is so interesting here that I am going to try to photograph a layer of metamorphosed shale between two masses of volcanic conglomerate. I found some interesting slate exposures on the descent this morning; slipped onto one quite emphatically. This island would stand a thorough surveying, and would reveal other than purely volcanic formations.

Lake Vaihiria:--12:00 to 1:00 P. M.

Barometer 27.77 inches. Elevation 1520 feet at water level.

At a point where sugar-cane commenced to take part with the rank weed forming the marshy shore of the creek, I had the extreme good fortune to scare a young rail into the water, and as it landed on the opposite shore I caught it. This bird, though rare, is not yet extinct then. We stopped for kiki at the mouth of the stream, which is gradually filling the lake bed with gravel; given a few more thousand years, it should succeed very well. I believe this marsh is so extensive that the rail will hold out here for several years

yet. The boys have gone to build a raft of Fei,--another use for the useful plantain! Three of us at least will swim the lake, for apparently no trail leads around it; although one might go over the table land west of us. How extremely hot the vertical sun is! Well, I must do some further hunting for rail while the boys build the raft.

Found, saw nor heard a thing. Returned and helped finish raft by playing the beaver and floating two Fei stumps to the scene of action. Splendid swimming in a fresh water lake! We put everything aboard and then struck out. The boys each took a Fei stump and straddled it, then handled themselves exceedingly well and did most of the propelling of the raft, to which I held with one hand and swam with the other and legs. Don't know that I helped much, but do believe I held up more than my own speed. We let the three dogs ride. It certainly was an experience, pushing a raft half a kilometer or so by swimming. Everything went well and we landed safely, bagging three of a family of four swallows just after reaching the further shore, which gave me work until midnight.

We are now housed in a very poor shelter. The roof, though many meters thick, leaks decidedly and is endeavoring to deposit stalactites from the roof. We heard a strange and new bird from the cliffs on either side this evening, a trilling whistle and a guttural "awk". While skinning birds, I heard distinctly five Nohua, but who could tell where in the great rim of cliffs surrounding this lake their burrows are? Perhaps the latest breeders, the rest having gone to sea with their families. Made good progress on the rail and lost but very few feathers; also succeeded in making specimens, of a sort, of all four swallows.

We move for the bus road at Mataiea in the morning, but

will delay to hunt all the way along, especially if I can succeed in calling Rupi or find anything else unusually scarce. This little rail appeased my disappointment exceedingly, for I can at least go in with big news.

December 21

6:00 A. M. Barometer 27.82 inches. Elevation rdg. 1490 ft.

After the late night work, I found it rather difficult to arise by six. But that strange and new Manu with the guttural caw of a crow, aroused us to open-eared observation at least. We have been studying in vain the cliff on the eastern canyon wall all morning with the glasses, and the talus slope beneath it in search of him. The sound comes from there; I do not think it higher. The call on the opposite side comes from the level of the table land, and I believe a thorough exploration of that and the base of yonder cliffs would reveal the bird. Is it the cuckoo or the paraquet? They are the likeliest ones I can imagine making the noise heard.

From a field glass study of the cliffs hereabouts, I have my doubts as to the abundance at least of swifts. Orohena trail would undoubtedly approach many probable places for them. Peale's swifts which fall "thousands of feet below" might have been merely the swallows which are so abundant. For certainly any bird nesting beneath overhanging cliffs, which are exceedingly prevalent in these mountains, could have no cause to be exterminated, and in fact should be as numerous and plentiful as are the swallows. Petrels also should be here, but probably the solidity of these rocks, in which there are few crevices, would prevent their nesting in abundance along the solid lava cliffs.

Teoro has arisen every morning before six and built our fire, a most praiseworthy habit, and one which has won for him my admiration. If I ever make the journey again, he will be chief guide, and will not assume, I hope, to boss the whole crew including me, as Tata has. By going in today, I can very conscientiously hold the boys to twenty dollars, as they call the five franc piece. They have worked for me but the seven days noted on last page of this volume, unless cooking the beef might have been called work. That and their bus fare should be ample, especially if I am obliged to pay for the dogs. I hope we have no trouble about them.

I saw a light-colored bird descend from the base of the upper cliff to ferns on a level with the upper extremity of Fei growing on talus slope.

By their camp-acts thou shalt know them. Teoro makes the fire and brings in nearly all of the wood. Phillippe hauls the water, does what dish washing is done, and other little odd jobs. Tata sits and smokes, or tells vulgar stories, or sings songs while the rest work, although he does volunteer ample advice and instructions.

The trail leading out of the Vaihiria lake bed was a little hard to find. The mound we ascended was but fifty feet above the lake, and extended very rockily over to the base of the cliffs, where a sharp pinnacle of rock marks the beginning of the descent into the gorge below. Here was a very promising looking hole. Upon looking inside, a little fuzzy, downy ball, with two black eyes and a long black beak started a strange little squeaking. I had found an accessible nest of the bo's'n bird. Emptied a can for him, then decided that it would not do because I had no proof as to the

identity of his species. So I staked him with a string to a rock, thinking that I could run up there next week and camp for the old birds. But luck or fate remained with Nohua and let the old bird come in with "kiki" for its pickaninny. Seeing a flash of white enter the nest, I hastened thither and swung myself out and up into the mouth of the hole, blocking the entrance. Then I caught the bird and applied pressure beneath the wings. It very obligingly disgorged two herring-like or sardine-like fish, and two squids which I later fed the youngster. Wrapped the bird up in Fei leaves and newspaper.

Teoro found feathers of a bird beneath the cliff, taking me there, where we searched diligently and found one of the tail feathers, black shafted, white webbed. The beak had faded, so still had no identity, but the old bird above furnished the proof that the species was the yellow-billed. "Moarua"(?) the natives call him. They kept all the wing feathers.

The trail dropped directly into the gorge thereafter, and soon took to following and crossing the stream, which would have been all right except for the fact that the heaviest rain I ever saw fell for two hours into that valley, and the stream became a mad and swirling torrent, which at one place swept me off my feet and made me swim for shore, gun and bird getting well wet and me slightly bruised. Fortunately I had just removed the hunting jacket to Teoro's high and dry shoulders, or this book would have been soaked worse. After that, I gave the gun to the natives and either swam, or climbed across on trees. Once or twice I merely held to Teoro's hand, which is a most reliable hold. These natives,--what powerful fellows they are! That torrent was mere play for them. At

one place I could not move across it with the aid of a tree branch, and had to try another place. But we arrived safely and spread everything to dry while we ate lunch and washed up. We had indulged in a cocoanut and orange above. Came on to Maara, and received a very hearty welcome. What a rare treat to find at the end of the journey such lovely people!

What amphibians these Tahitians are! To say that they take to water like a duck is slightly erroneous as a figure. Certainly they take to it like a heron, wading being their special qualification, but not being at all behind at swimming when that is necessary.

Lake Vaihiria is snuggled beautifully between Tetufara and a rival mountain on the east. From the lake a tableland rises at the foot of the former some seven hundred feet, but the latter is a sheer and very steep slope rising from the very water's edge, fully three thousand feet. That the angle is steep was proved by the sun, which at nine o'clock, when very close to 45° high, just fell upon our camp across the lake three hundred meters wide, or more. So the slope is decidedly steeper than that. Picture that covered densely with tree ferns and their accompanying vegetation virtually all the distance and mirrored in the lake below, and you have Vaihiria as we last saw it. The lake itself is green, the color being due, no doubt, in part to reflection of the verdant hue of the surrounding country, but somewhat due to the plankton floating in it. There would likely be new species of green algae for some botanist to study and describe.

Across the length of that expanse of verdant water the three natives shoved the Fei raft carrying our equipment. Tato

and Teoro were each astride,--if lying on one's belly in water can be so termed,--of a Fei stump, and with a powerful frog-like leg kick and an overhand alternating arm stroke forced the raft ahead by butting their Fei stump against it. One holding on to the raft, for I did little more, and watching the shore slowly passing, could feel and fully realize the strength of their swimming stroke. If ever human being approached web-footedness, they do. Those broad and sturdy feet certainly are the most wonderful understanding I have ever observed. Seeing them, one begins to realize where evolution has taken us of slim legs and graceful ankles with small and dainty feet,(a few of us being exceptions to the rule, of course).

It is not their swimming, but their wading ability that I admire the most and wish here to record, at least, for words cannot describe it sufficiently. Here they were carrying loads of fifty pounds and more, wading steadily and safely through a raging mountain torrent which picked me up and whirled me some meters down stream. Perhaps fifty pounds or so would have held me more firmly upon the cobblestones below the water, which struck us several times high above the waist. Then they would but hold their loads at arm's length above their heads and surge steadily across. The rougher the bottom is, the better they seem to enjoy it; and as to their judgment of the best place for a crossing, that is never at error. These three boys and the lad up the Tuarna (?) certainly taught me lessons about wading, but we puny creatures, or creations, of civilization cannot expect to duplicate their feats of strength.

Sometime during a dry season I hope to again make the journey to Vaihiria, when perhaps my impression of the gorge will be different from my present one, which is of a deep steep-walled

valley, verdantly clothed with vegetation, save where muddy water descends over numerous cataracts, with a flat though narrow bottom, across which a turbulent torrent winds like a snake doing the Hula Hula. Add to this dark clouds above, with not only sheets but even blankets of water intervening between earth and sky,--and that is Vaihiria to me.

But I would like to start down that same trail this morning, so thoroughly did I enjoy the marvelous magnificence of it all. It is only necessary to think about returning to the village of Papeete to make me long to start once more for the wonderful mountainous interior, for I am by inheritance, and certainly inclination, a cave man and a cliff dweller. I simply hate the idea of spending Christmas at Papeete, and certainly shall try to get out here to Maara where loveliness and hospitality abound.

December 22

Remained at Maara after sending natives to Papeete. At Maara betwixt the Misses and Mrs. Yerex, Mr., and Max my seasonable homesickness was considerably appeased. Mrs. Yerex is certainly a dear motherly lady, and the girls are charming enough to please the most particular. Besides other pleasures, the best meals obtainable on the island are served by feminine grace at Maara. It is the one place I have found where the native element does not prevail too strongly. In other words, I am not cosmopolitan, but decidedly Anglo-Saxon after all.

December 23

This day Max Yerex and I rode to Papeete on the stage. He is a very likeable chap, who is to be my room mate while we are both in town. Arriving at the hotel, we bathed, changed clothes, and went to the Becks' to report. The failure to find shearwaters was disappointing, but the rail (Porzana Tahitiensis) more than compensated for all other failures. My specimen is the only one extant, the others collected by Forster in 1774 having been lost. In other words, I found myself famous in science this day, although a little time may elapse before my fame spreads. But the thrill of being the collector of such a valuable and rare specimen is certainly gratifying. Nordhoff came over to see the wonderful find. Already Mr. Beck talks of a return trip to Vaihiria with Tafai as guide.

My "black-warbler" is the fly catcher (Pomarea nigra), and the Tropic-bird is the Phaeton lepturus or "yellow-billed", neither of which were of especial importance except that they were "fairly good skins". But "Porzana Tahitiensis" is the charm and is spreading my fame about here.

December 24

I enjoyed an informal visit and dance with the Miller girls last night. They are going out "Vairao" for Christmas, much to our ill-fortune. Went down today and relabeled several specimens upon which I had to put temporary field labels. Spent afternoon getting provisions for the proposed visit to the home of Porzana. Met Mr. Roland and talked at length. Also met Mr. Simpson at Maxwells and made his acquaintance, being invited up to his house

for a visit Sunday afternoon. He is a very remarkable man, as most men here are, in one way or another. He is very brilliant.

We wandered down to the Becks' after developing-powders, but the result was an evening's visit with the Becks and the Nordhoffs, topped off with our choice of lemonade or gin-fizz. It being Christmas eve, Max and I indulged the C.B.N. in the gin-fizz, which was not at all bad, but nothing to go wild about. Max holds opinions resembling mine about the inter-relation of the black or brown and white people. How can such broad-minded men marry the brown women? For the life of me, I cannot understand the ideas they must hold, especially those who are begetting children.

December 25

The first of five Christmas days spent in a foreign land! Where will the rest be? We spent it very quietly developing films, which for the most part were failures. The best roll, a V. P. of Mable's, we spoiled by leaving it in the fixing bath too long. Towards four o'clock we walked down to the dock and saw the Starr family off for New Zealand on the "Talune". In the evening we had a Christmas dinner with both colors of wine with the Becks and Nordhoffs. A well prepared and well served dinner at the Diadime.

December 26

Went canoeing with Max, but spent most of our time looking over boats at the ship-building yards. Returned to hotel to sleep most of afternoon. Went alone to Simpson's at four o'clock, and spent four very enjoyable hours with that exceedingly intelligent man. He is one upon whom the stultifying commercialism of America had the ef-

fect of ostracising him in this tropical land of freedom from customs. We conversed freely upon various subjects, from spiritualism to science. I read a story and translation of his, both concerning Tahiti, and both revealing considerable talent and the painstaking work of a thoroughly trained artist. He is a very remarkable chess player. His problems being world-famed, he has agreed to give me a few instructions in the game my next visit. I went down ostensibly to obtain the present address of one Lewis White Fox, former friend of Violet Beebe's father, prior to the latter's decease. Came off without it, but with the satisfaction of having made the acquaintance of one of the world's thinkers. We exchanged bird information.

December 27

After another strenuous night, I reluctantly gave up to dieting, and so, after a cup of hot milk, remained for the day in bedroom, and most of the time abed. Did get up enough energy to walk with Max down to Craner's for Jean. We met his two sisters, one a lass with long attractive fair hair, often noticed before; the other is engaged to young Donaldson of Maxwell Company.

Then we went down to the Miller's and spent the evening with the girls. I did not feel much like dancing, so spent most of my time caring for the phonograph. We were one man too many, but it gave me that much more time to rest, without bothersome explanations.

December 28

My ailment and diet have quite weakened me, so that this morning I did not arise to see Max off for the bus. In fact, I prac-

tically remained abed all day, except at noon and in the evening, when I cooked some rice with canned milk, and boiled softly some eggs. The Becks were up this evening. With the boat yesterday, he obtained several birds, including Boobies and terns, one new kind, running our number to twenty-two varieties thus far. He advised quietness and little food this week, but as I can string labels and take care of notes, a little time will be usefully employed.

December 29

Tafai came in, and we made arrangements to tackle Vaihiria Monday, provided rains permit. He is the same smiling, good-natured fellow, and seems anxious to conduct me alone into the hills. Our plan is to spend several days at Vaihiria, and then proceed to the Punaruu country, searching for Nohua along the route wherever any promising ridge occurs. He said we could live mostly upon the natural food, so plentiful in these hills.

December 30

Went out to the rice field this morning and shot about forty weaver birds, yellow-rumped, by flock shots with number ten shot large shells. Many were damaged, but during the afternoon Mr. Beck made up twenty skins, while I turned out five.

December 31

This morning Patete and I caught a cart ride to Pirae and ascended the river a considerable distance. We had fairly good luck, bagging ten birds including the hen and chick of Jungle Fowl, at least we believe it is. They so closely resemble their varied descendants

that it is extremely hard to say whether or not the bird is a direct lineal descendant, or merely a reversion to the original stock from some domestic variety, brought long since by the Polynesians in their migration hither from India; which of course is a very likely probability, and may also prove a stumbling block in a scientific comparison of animals and plants found between here and India. Of course no scientific decision can be reached until a thorough survey is made in all the branches of science. Birds that would never be likely to fly from one island to another might have been introduced. Fruit trees also, but there would be land-snails, lizards, corals, and tidewater animals indigenous and incapable of self-distribution, which would form a reliable criterion upon which proof might rest. We boarded the Carnegie, and after seeing the ship and hearing a lecture concerning it, had tea with the men. Had dinner with the Becks at Diadime.

BOOK IX

New Year at Papeete

Voyage to Marquesas Islands
Enroute Christmas Island

Jan. 1--Jan. 19, 1921.

January 2

Spent a few moments aboard the "Carnegie" checking the reading of our aneroid barometer with their mercurial one. They leave in the morning and expect to take about forty days to reach the northern islands. These men have been out one year and a half on their circummavigation of the world, which is for the purpose of making observations regarding the magnetic pole, dip of needle, etc. For geodetic men it is an opportunity such as this excursion is for me. Land work is, however, more interesting, but men who are students certainly do not get bored by even seventy-five days without seeing anyone else than their shipmates, especially with all the Carnegie Institute publications aboard.

January 4

Mr. Beck and I are busy getting boxes, sacks and the like for packing birds and equipment. We are sailing for Christmas Is-

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land Thursday, or possibly Wednesday, night, which means pack up and load tomorrow. The wanderlust certainly has got me, because I am always ready and anxious to be going somewhere or anywhere for that matter. Papeete even will very likely look interesting and feel somewhat homelike when we return; I shall at least miss my visits to Maara. This trip can be made extremely profitable if I keep my energy at its proper status of activity and do not fall into a languid indolence during the voyage. We stop at the Marquesas on our way up.

January 5

My throat is very sore,--some trouble in bronchial tubes. Kind of weary all day, but kept going by excitement of wanderlust. Was packed and ready at one. Gathered up boxes and took my things to dock, boxes to Beck's, three bags and one bird box to ship. Got things aboard, looked the ship over; it is quite an interesting little boat, "Moana", Company Naval de L. Oceanic, sailing three P. M. tomorrow,--maybe!

January 6

Awoke at 12:30 and wrote letters until after four, then slept until eight. Spent morning addressing letters and finally succeeded in mailing twenty-six, which should hold my correspondence until our return. Went aboard after saying my farewells at the hotel and Miller's, Maxwell's, and the like. They pulled the ship back alongside the wharf, so we are at liberty until six this evening. We are now endeavoring to get our permits for stopping at the Marquesas. Met Father Roget and he seems to be a very in-

teresting fellow. Upon our return we will become better acquainted, and I may obtain the recent history of the island. By the extremest good fortune, Lesguereaux extended our old permits for this year, but it was only by stretching customs long rigidly fixed; a rare thing here, for which we are duly grateful. Mr. Beck and I ate our last shore meal at a Chinese restaurant after a dish of ice-cream.

6:00 P. M. Cloudy. Calm in harbor. The engine seems to run satisfactorily, and we will probably soon be under way,--probably and probably not! For after running the engine fifteen or twenty minutes the mate, translating the engineer's parley, informed us that the "Moana" would not leave until tomorrow.

January 7

Cloudy. Pulled away from dock at 4:20 P. M. The typical cloud bank hangs around the summit of Aurai. Outside the reef we steer a course NE by N. A head breeze, sea very gentle. At eight bells we were steering ENE. Here the engine was stopped and below decks it hardly seems that we are traveling at all.

How far more interesting it was leaving Tahiti to again gaze enraptured at her magnificent mountains! Those mountains have become familiar friends since last I gazed upon them from beyond the reef. First we studied Aurai and tried to determine just where Tuaurae and I went. No doubt we got very near an altitude of four thousand feet up the ridge which ascends west of Pirae. The east ridge will give a much longer climb at high altitudes when we later decide to assail the summit. Then as we sailed along, the Diadime came into view between Pie Rogue and Aurai, and passed behind the latter; while lofty Orohena shook herself free from enveloping

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Cloudy. Pulled away from dock at 4:20 P. M. The typical cloud bank hangs around the summit of Aurai. Outside the reef we steer a course NE by N. A head breeze, sea very gentle. At eight bells we were steering ENE. Here the engine was stopped and below decks it hardly seems that we are traveling at all.

How far more interesting it was leaving Tahiti to again gaze enraptured at her magnificent mountains! Those mountains have become familiar friends since last I gazed upon them from beyond the reef. First we studied Aurai and tried to determine just where Tuaurae and I went. No doubt we got very near an altitude of four thousand feet up the ridge which ascends west of Pirae. The east ridge will give a much longer climb at high altitudes when we later decide to assail the summit. Then as we sailed along, the Diadime came into view between Pie Rogue and Aurai, and passed behind the latter; while lofty Orohena shook herself free from enveloping

clouds and loomed majestically skyward,--most certainly a glorious peak, and one worthy the efforts of the best of mountaineers. Then could be seen the full depth and grandeur of the Valley Tuaura, which leads inland from Pt. Venus between the two highest ridges and peaks on the island. This is the one Darwin ascended, and it is strange that he chanced upon the most gorgeous. Later the Popenoo Valley opened a wide gape into the interior and the pass to Vaihiria was plainly recognized with Tetufaro on the west and her twin peak on the east. After dinner the island slowly faded into the hazy indefiniteness of twilight, and but the long stoping ridges were outlined against the light western sky.

An evening planet shines brightly directly astern and even sends a path of flickering light along our wake. One by one, or rather, one thousand by one thousand, the stars burst into view. Darkness is upon us, and a very fascinating phosphorescence makes our propeller-churned wake the chief object of interest.

Now for the first of many nights upon the hard, flat deck,--long and partly sleepless nights no doubt. But of course one can always arise and gaze at the phosphorescent sea. We are under way, and that is something. Had a splendid dinner, but the French priest (red-headed), our other cabin passenger, could not finish his first course. I'm glad we are good sailors.

Bacon it was who remarked upon the fact that men going upon sea voyages where there was nothing to see (poor unobservant Bacon!) always wrote journals, while men traveling by land where there was everything to see (he should cross the desert somewhere) seldom recorded their experiences. Did Bacon never stop to think

the matter out? Men upon the land usually pass as rapidly as possible from one point of civilization to the next, seeing far less than sky and water; while men upon a sea voyage soon weary of their fellow passengers and seek solace with pen and paper and their own thoughts.

But how could Bacon, of all men, ever infer that a sea voyage is devoid of sights to be seen? There is always a wave that has never been seen before. There is always a newly seething foamy wake, alive at night time with thousands of little scintillating flaring specks. Then there are always two prow waves trying to offset the ocean swells. Add to that whatever life is likely to appear in the forms of flying fish, dolphins, sharks, whales, or various petrels, shearwaters, terns or albatross, and one has quite a little to see, after all. There is but one reason why the sea is not as enjoyable scenically as land,--indisposition of the observer.

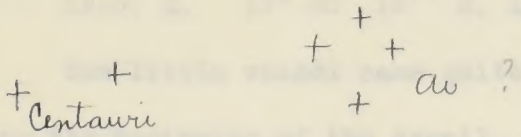
This third voyage is just as full of thrills and excitement as any I have yet taken. It is considerably more interesting because of a slight increase in knowledge concerning the things to be observed. On the first trip, I could but see with a layman's eye these animated objects other than man. Everybody studies mankind to the full extent of their ability, interest, and inclination; but few endeavor to so instruct themselves that all things,living and dead, are of intense interest. The next voyage was full of interest because the few months more of studying opened wider my eyes; while this trip is still more so because of a concentrated and intimate interest in birds.

On land there are plenty of things to see, and it seems strange that Bacon who saw so many things himself should be so

stultified in his advice to young travelers. Of course, he was writing for the young gentlemen of England, not for all men. Still, Darwin was one of that class, but having eyes,--and such eyes--he saw. In spite of all the silly criticism of John Burroughs and other nature demagogues, Darwin still dominates every branch of science known,and most of the civilization of modern times. He is second only to Jesus in the effect of his thoughts upon mankind, and many who profess to follow the precepts of the one are the best examples of the natural laws explained by the other. We profess Christianity while we bend every effort to become the fittest for survival at the expense of all others. We idolize Jesus as the Christ while we strive to eat and not be eaten, and to propagate our race.

January 8

After writing two hours this morning, I returned to my blankets and star gazed. There was the Southern Cross and the Centaurii pointers risen to about thirty degrees. This, then, is like our northern Dipper and Cassiopea being well away from the polar point, and so making the circle around that spot each day.



It was not the least bit difficult to make out the resemblance to the cross when it neared a vertical position. The innermost of those four cross rays of light which form points on stars could, by the least bit of imagination, be stretched to form eight paths connecting the four stars. No wonder New Zealand uses this

symbol of Southern Seas, for when it is highest it must be very nearly above the southernmost part of the south island.

Snatched a few winks of sleep off and on until day began to dawn. Then put my head upon rail and watched the changing colors of Aurora's brilliant robes ere Apollo's chariot, a huge irregular disc of copper, came up out of the sea. Then followed a rich brassy haze, all in the eastern sky, that would tax the descriptive powers of Coleridge. Often have we heard people expound the glories of sunsets and sunrises in some particular locality, but I have yet to find any one place which greatly excels any other. From desert to tropical jungle, a sunset is a sunset; and to those who are wise, a sunrise is a sunrise. Fascinating, charming, entrancing, beautiful beyond all imagination at times, they occur wherever man has the eyes to see and the artistic temperament to behold them.

A few birds and flying fish were seen this morning. I tried the bow, always the preferable part of any ship, but got splendidly drenched with spray, so retreated aft. Just before noon, a one-masted boat appeared off our portside, and is now considerably nearer, as is also a little squall.

12:00 M. 17° 20' 15'' S. Latitude.

The little vessel came quite close and passed astern of us during the beginning of the squall, but she pulled down most of her canvas except the forestaysail, and dropped rapidly behind as we, with all our canvas spread, plunged ahead in the gale. With slicker on, I sat upon deck and enjoyed the shower and breeze, but it didn't amount to much.

During the afternoon, I was unable to remain in the cabin

and study, a light-headedness greeting me at every attempt. Took Darwin above, but did not read much. The sea is so fascinating, I can watch the waves with interest all day long. Being naturally lazy and indolent, I find myself quite contented to lean over the bow-rail and just watch the white foam and the deep cobalt blue of the ocean. Did not eat much supper, but indulged freely upon pine-apple. Am nearer seasickness today than ever was before. My cold has settled into a catch deep-seated in my chest.

January 9

Was quite inclined to sleep on, when at sunrise I looked up to find Mr. Beck and Captain had finished their coffee, so piled out, or in Marine Corps parlance, "Hit the deck!" Although not quite myself, still having rather uncanny disturbances in the nether regions, I obtained a bit of line from the bo's'n and put in about fifteen minutes of good swift rope-jumping. That made me feel much better and brought on a good coughing spell which cleared out my bothersome bronchial tubes and head. A little spell with the rope whenever I feel out of sorts will, I think, keep me in good working condition.

3:00 P. M. Makatea, with us at the apex, forms the base of an isosceles triangle. How far are we from the island, if it is five miles long, apical angle about 50°? On the west of the island can be seen cliffs, said to be 230 feet high; also the works of the phosphate company and a ship at anchor in the bay.

Freighters: "Whancapé"(Dunedin) and "Kaiwarra"(London) are at anchor here. The phosphate company seems to have a very prosperous looking plant here.

Not a sign of nesting birds were visible in all the many likely caverns along the cliffs. A very interesting island which we will, of course, visit later.

We are approaching one of the largest islands of the Paumoutu group, head on, but no land yet in sight. When near it, we are to change our tack from NE by E to ESE. The Captain just awoke and is above now throwing her over. We will run down this new course four or five hours, and then in the morning will swing back and go between the Rangiroa and Arutus islands. We should see Kaukura and Ahe off the starboard as well as the last of the two, south of Rangiroa, the longest, if not the largest, of all of this vast group of seventy or eighty coral islands. What a piece of land must have extended from here to Easter Islands, long before the basin of this vast sea sank to its present enormous depths!

I went hand over hand twenty feet or so up the mainsail hauser (?), and so obtained a fairly good view of the lagoon and could see the distant reef of the opposite side. It feels just as safe and solid up the mast as it does on deck, but the exertion and strain of hanging on is rather strenuous, while the magnified motion makes field glass observations rather difficult.

Birds are so scarce that I think I'll go below and string a few hundred labels. Came below and cleaned and sharpened scalpels, which I found to be rusting a bit. Was called above by the Captain to see a pair of Frigate birds, which, like the albatross and hawk,

flies for long stretches without apparently moving its wings. Of course it must move them in some manner not perceptible to us, in order to offset gravity. I suppose, however, it would take a very thorough study of comparative anatomy of birds to accomplish such a result as would prove just which muscles were better developed in such birds than in others of rapid wing beats. There is a subject worthy the study and research for a Doctor's degree.

11:40. Once again we approach the land. What an immense atoll this is! They are throwing her around now on the outward tack. We should clear the island next starboard trip, which we did not; but along in the early afternoon we cleared it and traveled alongside the broad end for quite a spell. Towards evening, we pulled away from that island, and just before dusk came within sight of Arutua. Then followed a spell of anxiety for the Captain, because we did not clear the further points until along towards eleven o'clock.

While Mr. Beck and the Captain were keeping a sharp look-out for breakers and the reef off the starboard, the lady passengers, the crew not on duty, and I indulged in a little evening of,--shall I call it music? Personally I like the melody of these vowel-ending syllables, the energetic spirit of their songs, and the harmony of their voices. For my part, I amused them by a very poor "Hula", and once or twice yodeling, and then singing "Yale-a-Boola", which takes well. They have all been trying to yodel since, but can't get the tongue and throat twists.

Turned in early on deck and stuck it out throughout the night, in spite of three or more showers. Slept a bit uncomfortably toward morning, but did not get up.

January 11

Had a slight headache this morning from the lilt of the ship keeping me head downward, but I was too lazy to move. Having had the most sleep, it was only natural that I should be the first to rise at five o'clock. Again we are out of sight of land, and will probably not see any today. What mere specks these islands are! The atolls are but limestone monuments marking the burial place of little spicules of earth once standing above the water. How foolish for anyone to think that these islands were built up from an ocean floor thousands of feet below, when corals can only live but a hundred feet or so below the surface! Such people must believe in a most remarkable adaptability to environment. They would probably at the same time denounce the probability of change by evolution from one variety to another.

Given a mass of water as enormous as the Pacific, and a depth of from six hundred to twelve thousand meters, with one atmosphere of pressure for every ten meters of depth, and the resultant force upon the ocean bottom must be tremendous indeed, and quite sufficient, in my mind, to bury whole continents, even though they might have extended from Easter Island to India. If the Himalayas and Andes Rockies formed a weaker or lighter belt, it is only to be expected that they should be elevated and that this great basin should sink. This sinking would close the volcanic craters and vents in the basin by crowding them firmly together, while it might be expected to open new vents along the two rims.

Hence, it is my opinion that the volcanic islands of the Pacific are

of a more ancient period than the Tertiary outbursts of the western Americas, or the uplifting of the Andes-Rockies and Himalayan mountains.

That this sinking is tremendously slow is evidenced not only by the fact that the slowly growing coral has been able to maintain its surface reaching reef, in most cases, but also by the fact that at Tahiti, instead of having fiords or submerged valleys, a very uniform circular boundary exists, with but slight indentations at the valleys which have been able to fill their mouths as rapidly as the sinking occurred, or even to build points out into the lagoon. That Tahiti has been fairly stable for a considerable period is evidenced by the great depth of the interior valleys. The river Popenoo, for instance, is but four hundred feet high at least eight kilometers inland. Having cut a tremendous valley out of the island, though it might have been aided in the first place by this being an enormous crater-basin, that would leave but the cutting away of the rim on the one side, which would not have taken long in the easily decomposed volcanic conglomerate found there. But I do not believe all the gorges of Tahiti were thus easily formed. Popenoo, Punaruu, Fantana, and Vaihiria appear to have been craters. Pirae, Tuaura seem to be pure gorges, water carved.

January 12

My long nights of sleep even are not proving sufficient to wholly obliterate my cough, but it is not very bothersome, only leaves an unpleasant tickling sensation about the chest. Had trouble this morning in jumping the rope one hundred times without a

miss. Reached seventy-eight once, ninety-eight another time, but when finally successful, ran forty-seven extra swift jumps. Fifteen minutes of that vigorous exercise are quite enough. We have had a very stiff breeze most of the day, which made proceedings off the bow rather difficult. Once this afternoon, I went forward and leaned over the windward rail at what I supposed was a safe distance behind the bow. While watching one of the sailors scrambling to safety, I got the full splash of the wave myself, much to the delight of the crew. Thereupon, I perched upon the galley and watched the waves from that vantage. Returned the laugh in full upon about four sailors when a good wave soaked them thoroughly, and even sprinkled us up where we were. A squall is now approaching, but we are off a little towards one edge of it. Cool and fresh is the breeze. It is preceded by a low-hanging, dark, ominous cloud. The Captain has taken the helm, as is his custom at such times.

I have often noticed these Polynesian natives regarding their children. They are far more tyrannical as parents than Americans, demanding quick and unquestioned obedience to their orders. They seem to neither expect nor permit any thought upon the part of the child. They demand strict Prussian military obedience.

January 13

Took a capsule of quinine last night, which kept me well warmed up during the period abed. We had a stiff breeze all the time, with very light squalls which drove the rest below. I'm glad I've got a bit of canvas to pull over my head. The less I am in the cabin the better I enjoy myself at sea, but it is raising Ned with my let-

ter writing. I haven't yet written two of the thirty or more I should get written this trip. Ought at least to write one each day.

The waves are very fascinating this morning. Every once in awhile comes a short succession of billows and troughs, which toss the ship up and down to considerable heights, but not so much that one is not able to stand upon the deck. I wonder how long it will be in these five years before we strike a real storm, one which will make it necessary to cling tightly to the ship to keep from being washed overboard. Well, there would then be the trouble that a passenger would be ordered below. But I'll see something of one yet, I hope.

Just after luncheon, we came into a zone of floating sea weeds, where numerous small fish were jumping excitedly out of the water. The men commenced yelling excitedly and hastened to get fishing tackle overboard. The Captain was first, and then the fun began. Our first information of success was the snapping of the bamboo pole he used; with the remainder he cast again, and this time landed a good three pound fish aboard, but again snapped his pole. Again he cast, and the third time hooked a fish and snapped the pole, losing the fish. They are a very game fish, with large bodies and very slim tails.

I have diligently sought the fresh South Sea breezes, but after a week at sea, my cold has developed into a deep-seated coughing, which recalls too vividly to mind that night on the "Buffalo" three and a half years ago, when Dr. Thomas sent the Top Sergeant calling all over the ship for me. From my hammock on the top-port-side I went below for that special conference.

"How old did your parents live?"

"They're still alive."

"Healthy?"

"Yes."

"Your grandparents?"

"Two still alive, about seventy and eighty. One died in his forties and one in her fifties of dropsy."

"What did the one grandfather die of?"

"Don't know. He was a hard-working Mormon pioneer. I think he was healthy enough."

"Have you lived in a crowded district?"

"Each of us had eighty acres to play in at home, and a hundred miles of free range beyond that."

"Yours is a strange case. Take this paper cup and save the coughings of the night. Do you sleep on the open deck?"

"Yes, in a hammock."

"Good!"

But he never told me if he found the particular bacteria he was looking for in the phlegm I gave him next morning, and diagnosed my case as bronchitis. Again the same condition prevails. This afternoon feeling drowsy, I slung the Captain's hammock down in the cabin and snoozed from near noon until the boy began setting the table. Then I came up and washed, and have been coughing almost steadily since, while my chest itches fearfully. No wonder the Southern Seas failed to cure R. L. S. when one can so easily contract a closely corresponding malady. Working upon the theory that

it might even get me dead to rights, I should spend every ounce of energy,--which is not very much,--producing something to leave behind me. Then comes the dinner call, and I go below and devour a man-sized meal, which makes me think there is absolutely nothing wrong. That is one considerable difference between this voyage and that of the "Buffalo" where the food was none too tempting and the rush and push to get it often too much bother. Here we are lapt with luxuries, including wine if we want it. Mr. Beck took it the first meal; I gave it a fair trial for six or seven meals, but have not the slightest inclination to adopt the French custom.

We are at present virtually becalmed. The engine quit working just before dinner, and for some reason or another all the sails are furled save the foresail, which barely catches enough wind to hold us to our course; while the waves coming almost broadside on roll the helpless ship at will, much to the discomfiture of our religious passenger. But he has his Bible for solace, which no doubt he finds in it in spite of the long week of seasickness he has had. No doubt this is but a trial of his faith and sincerity.

While I slept during the afternoon, a fairly calm condition induced the Captain to lower all but the foresail at one-thirty (shortly after I swung in) and use the engine to go prow into the wind. After dinner, we had a little excitement which commenced up forward where the men were shouting. The engine had been for some time stopped and we were becalmed. He came alongside the starboard and thence went astern, a green flash in the deep blue water. Again all was bustle and hustle as this one and that one hastened after the necessary lines and bait to catch a shark.

The Captain assured us that he would catch that shark, and of all the surprises, for he took a heavy hauser line and made at the end of it a large noose. This he lowered to the water. Then he took some fish cord and tied a loaf of bread to it, which he dragged above the water to tempt the shark. But in spite of all calling, "Come Charlie! Come on Charlie boy!", Mr. Charlie (Chaplin I suppose 'cause I'm to have a cane of his back-bone) refused to bite. I suggested bacon or a can of beef, whereat some voluble French from the Captain and the disappearance of Jean, the Cabin Boy, who returned briefly with a tin of salmon slightly opened.

It was not long after that when Charlie was observed coming along the salmon scent with a determined expression. Then I noticed that the Captain had lowered the salmon can by the small cord through the noose of the heavy hauser line and I saw through the scheme. As Charlie reached for the can, the Captain dragged it through the noose, and Charlie followed. Then the Captain and I heaved hard on the line and the noose tightened around Charlie's gill-slits. Charlie proved to be Mrs. Chaplin and about five feet, four.

There was a large pilot fish with her in the water, but he left as the noose tightened. He was about fifteen inches in length. There were three smaller ones, two brown and one blue about five inches long, which I found on the deck. Queer little things with their oblong sucking disc with which they cling to their disreputable, though no doubt, bounteous host. By clinging to those lateral fins they very likely come into close contact with whatever food Mrs. Charlie slobbers in her gluttonous hurry to fill a belly made of elastic rubber.

Mrs. Charlie took a bull-dog grip of the hausier line

last night and did not let go for an hour. The Captain assured us we would have a good breeze now we had caught the shark.

January 15

After breakfast, two men were set to work to carve up Mrs. Chaplin. She now lies a very flabby bit of tough hide and flesh, four fins, a head, and a back bone. One man is trimming out the jaws, while the other cleans the vertebrae. Her jaws were, and still are, about ten inches across. With two exceptions, she had a very even and beautiful set of teeth, with a transparency and pearly whiteness which any movie actress would envy.

There is nothing more to the story until the two valuable parts of her are cured. It is not much to commend a lady, but good teeth and a subtle backbone are a little towards those charms which enslave the other half of the world. Incidentally, the only food found in her stomach was a small portion of boiled beef and macaroni.

Two Tropic-birds have been around this morning so close that Mr. Beck finally tried to get them. My gun failed to fire because a small pin necessary to cock the piece had dropped out in assembling it, so he missed the first opportunity. Later, with his own gun, he dropped one bird just barely off the starboard bow and we were unable to reach it without plunging into the brine, and even I was not rash enough to do that after cutting up Mrs. Charlie this very morning. The Captain says we are likely to see several more and different kinds of sharks, including hammerheads and the distant relatives, the sawfish.

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January 15

After breakfast, two men were set to work to carve up Sue. Chaplin. She now lies a very flabby pit of tough hide and flesh, four fins, a head, and a back bone. One man is trimming out the jaws, while the other cleans the vertebrae. Her jaws were, and still are, about ten inches across. With two exceptions, she had a very even and beautiful set of teeth, with a transparency and pearly whiteness which any movie actress would envy.

There is nothing more to the story until the two valuable parts of her are cured. It is not much to command a lady,but good teeth and a subtle smokbone are a little towards those charms which enslave the other half of the world. Incidentally, the only food found in her stomach was a small portion of boiled beef and macaroni.

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Today we passed two very interesting scattering flocks of birds. The first contained the white and sooty terns and black shearwaters; the second had boobies in addition, and both were under sharp surveillance by those tyrants of the sea, those indomitable pirates, the Frigate-birds. The last time one of them had put to chase a white tern, but evidently the little fellow had not made a catch because he steadfastly refused to shift any fish cargo overboard for the pirate.

Another interesting occurrence of the day was the appearance of red-billed Tropic-birds accompanied by white terns, an association that seemed more than casual, as it occurred several times.

These moonlight evenings are very conducive to festivals. The younger lady is very adept upon the accordion, while the elder is a veritable leader of congregation hymns. The songs they sing mostly are, I believe, native chants, full of vigor, rhythm, harmony and spirit. There is not a distinct gradation of voices into our set forms, but different parts are very euphoniously carried by the gentlemen singers. The great charm, however, is in the melodious possibilities of the language. There is never a harsh sound that occurs in any of their songs. What artists of real melody these people have been, to have eliminated from their speech all those harsh and severe sounds which so mar the elegance of most languages!

If they had but developed some musical instrument to correspond with their songs, how they would take America by storm as did the Hawaiians twelve or so years ago! I would like to see some enterprising fellow take a small troupe of perhaps a dozen of these Polynesians, and let them sing as they have these moonlight evenings aboard the "Moana".

January 16

This morning at coffee I received the whole table d'hote, covered for five, in my lap,--hot coffee quite plentiful,--while my chair tilted backward, swayed to and fro and finally went over.

Mr. Beck says there are birds this morning, which should be so, since I have remained below.

Well, the Captain was certainly right about us getting a blow after we had caught the shark. It came up on us slowly that night; was a light breeze, but has been a stiff breeze ever since we cut up the shark and hung the vertebrae up to dry.

There are other passengers aboard which I have terribly neglected in these notes. They came aboard the last day we were at the dock, a whole swarming mass of them. I saw them literally covering the quarter deck, where they were leaving their wings behind them. And well they might, for here was free and easy passage to distant lands. They are possessed of one very abominable trait, and that is an unquenchable thirst, which they inevitably endeavor to quench at our drinking faucet. Presto! Your glass is well filled with swimming ants! But they have their benefits as well, for the instant you kill one of the squatters' right residents, the cockroaches, here are thousands of little slaves at your heel or toe, whichever crushed the roach, to convey the detestable thing away from your sight.

January 17

On this journey I have had the opportunity of studying very closely a very typical Tahitian lady, there being here present three distinct stages of development: the children, the young lady,

and the woman. Of them all, the little girl, six years or younger, is far the most attractive. With her curly head of black hair, her round face and big white-balled eyes, small flat nose and thick open lips, this little child is interesting to look upon. Advance those same characteristics to young womanhood. Given a beautiful head of long black silky hair, black eye-brows and lashes; black-brown eyes, with the contrasted white balls; still beauty cannot reside where the skin is all of a chocolate-brown hue with no chance for complexion to portray itself. Then take the prognathous features, the low and sloping forehead, with the recurved bridge and broad flat nostrils of the nose; the prominent cheek bones; the short upper lip and protruding open red part of the mouth, coarse, thick and entirely devoid of firmness; add a chin of no particular shape, and to these add ears made prominent by jewelry (and ears never were an adornment of beauty), and you have the average Polynesian girl of twenty. Give her an even throat and well-rounded neck and arms, her shoulders are inevitably square and even masculine. Her chest is full and her breast usually large and not firmly round. A wasp waist never existed in the South Seas, I'm afraid. Of course their loose dresses prevent restriction, and stays no doubt are seldom heard of; but there is a heaviness and squareness of body from shoulder to hips which is very common, and distracts enormously from what few claims they have for admiration. As for gracefulness of hips and legs, I doubt if there is to be found one model in the island who would do for a sculpture. They are very coarse, and best described by the term "husky". As for their feet, there are few who could wear number five men's shoes, and then only if broad sizes were obtained. Ankles are heavy and muscled

over, instep perfectly flat and broad, toes with an unusually large gap between the big toe and second; calf of leg very poorly shaped and unattractive. Their arms are round and smooth in several instances and wrist well tapered, while some of them have really graceful slender hands, with elongated nails on slender and evenly tapered fingers. Both toe and finger nails are kept trimmed to the quick.

The Tahitians as I have observed them have very poor teeth, though these two women are very diligent with their tooth-brush. Gold caps and fillings, or else wide gaps are noticeable in every mouth.

But the men, the more I see of them, the more I admire their powerful backs, sturdy shoulders, and sinewy limbs, fore and aft, while their facial features don't seem so bad, and one can even find character expressions in them. The more I see of other races, however, the more firmly I believe that each race ought to keep to itself; not nationalities, but at least races distinguished by decided characteristics such as skin pigment, skull-shape, and the like.

Here is the elder of the two children looking at me from her prison cell, the cabin berth where she and her sister are confined night and day by the tyranny of unreasonable motherly love. She shows the unmistakable signs of the half-cast.

January 18

The psychology of approaching land is showing its effect upon the passengers and crew of the "Moana". The priest is eating at table now and shows no signs of sea-sickness. The women are around, hale, hearty, and flirtatious. The four Marquesans were in the rigging last evening until dark, anxious for an early glimpse of home. And the other passengers have more birds to watch. With the

engine running this morning we are heading pretty well into the wind.

January 19

Yesterday afternoon about four-thirty, there came into view out of the distant fog bank a few magnificent pinnacles,--the summit of the very mountainous little island of Huapu. A little later we were able to make out the larger and more regular lines of Nukuhiva. About this time the engine was started, and at dusk the sails, save the foresheet, were lowered. Our course during the night has been due east. We were becalmed one hour. This morning we are but a little beyond Huapu, of which we are permitted to see but the lower portion, unseen yesterday, while the pinnacles are in the clouds.

This engine is rather an expensive affair. It costs in the neighborhood of nine dollars an hour to run it, and it will only make two and one half miles per hour against the wind.

One of the men who last evening was telling me about his trip to San Francisco, mostly by the sign language, has just now called my attention to the greenish mirkiness of the water here, while at Tahiti it is clear and blue. This is perhaps a belt of plankton and shallow sea. There was a decidedly greater amount of phosphorescence in the water this morning than ordinarily. The ship's wake, stirred by the propeller, was so brilliantly aglow that it seemed a light were stirring upon the water from the stern of the ship. The ocean water in Tahitian is "Miti" and is not considered as "Pape" at all.

After steady sailing or gassing all day, towards evening

engine running this morning we are heading pretty well into the wind.

January 19

Yesterday afternoon about four-thirty, there came into view out of the distant fog bank a few magnificent pinnacles,—the summit of the very mountainous little island of Huapu. A little later we were able to make out the larger and more regular lines of Nukuhiva. About this time the engine was started, and at dusk the sails, save the foresheet, were lowered. Our course during the night has been due east. We were becalmed one hour. This morning we are but a little beyond Huapu, of which we are permitted to see but the lower portion, unseen yesterday, while the pinnacles are in the clouds.

This engine is rather an expensive affair. It costs in the neighborhood of nine dollars an hour to run it, and it will only make two and one half miles per hour against the wind.

One of the men who last evening was telling me about his trip to San Francisco, mostly by the sign language, has just now called my attention to the greenish mirkiness of the water here, while at Tahiti it is clear and blue. This is perhaps a belt of plankton and shallow sea. There was a decidedly greater amount of phosphorescence in the water this morning than ordinarily. The ship's wake, stirred by the propeller, was so brilliantly aglow that it seemed a light were stirring upon the water from the stern of the ship. The ocean water in Tahitian is "Miti" and is not considered as "Pape" at all.

After steady sailing or gassing all day, towards evening

we approached the west end of Hivaoa, and then sailed along it until the anchorage was reached at a very interesting little bay which evidently is a drowned valley. What a contrast is here from Tahiti with its Barrier reef past Rangiroa, that great atoll; and then to come here where these mountains poke up out of the water without any shore line, let alone coral reef! We sailed within ship's length of the points all along and it seemed plentifully deep. The cliffs rise abruptly from the water to hundreds of feet, in places. Above them we saw numerous goats. This village is situated at the mouth of a valley which forms a great amphitheatre, with the highest point on the island forming one end of the semi-circular rim.

The Company Navale de l'Oceanie manager and another came aboard; the latter talks American. They inform us that Linton and Mr. and Mrs. Handy are here. We went over and met them, spending the evening and learning a lot about the birds, of which they had two very interesting specimens; one was a white-throated, green kingfisher, and the other a red-capped fruit dove. They report that birds are plentiful here if we get away from this immediate neighborhood, which is rather hunted out by the natives who possess firearms and are good shots. We have to see the administrator tomorrow morning, but will then start after these interesting species. We heard one, but whether the thrush or warbler I could not swear. It sung even more thrush-like than Tahitian warbler. We will have plenty to do to keep us busy for the few days we are to be here.

The island is but very sparsely inhabited, and the inhabitants are fast dying off from lack of child birth, due no doubt to abuses. The man who came aboard is on a vanilla plantation up the

valley in the drowned mouth of which the ship lies at anchor.

Found the ground a little bit unsteady upon landing, and the half mile walk was a bit tiring, I having neglected my rope-jumping since we caught the shark.

It is well to finish this volume here, for this is to be a rather new phase of life to describe. Here are a people who are soon to be extinct. It is well the fellows here are getting their data now, for soon it will be buried with the dead, a few inter-graded castes only remaining.

BOOK X

Hivaoa, Marquesas Islands

Voyage to Christmas Island

Jan. 19--Feb. 10, 1921.

January 19

Arrived and anchored in Tahuka Bay, Island of Hivaoa, Marquesas. Mr. Beck and I went ashore with the manager of the Navale Company de l'Oceanie and a young Frenchman who speaks English and Spanish. We went on over and called upon the American anthropologists, Linton and Handy, here from Honolulu for museum work. They said Hall had informed them about us. They had two dove skins of the red-capped species, also the remains of a green and white kingfisher. They told us that this was a great place for birds and filled us with considerable hopes. Mrs. Handy and her husband having gone through the Marquesan-French dictionary in search of words important in their work, had marked all words relating to zoology, so I set to work to copy those referring to birds.

After a very pleasant visit, we returned along the one mile walk to the boat landing, gave the yodel, and were soon after aboard. The short walk told decidedly upon my unused leg muscles, but it felt good to get that much exercise, and no doubt that little stroll

helped for the next day's hunt.

The population of these islands is very rapidly declining, these fellows think because of the lack of child birth, due no doubt to abuse. There are several of the older natives here, and they are marvelously tattoed, a custom which has prevailed in spite of missionaries here.

January 20

Mr. Beck and I went ashore at eight o'clock by our time, and found that they are some forty minutes ahead of us here. Went on over to the Americans and found that the Administrator could not meet us until ten o'clock. So I set to work on the dictionary, and by lunch time had succeeded in getting through it, and in looking up some useful words in the way of colors and concerning birds. Considerable similarity exists between this and Tahitian, with the addition of "K" here, which makes the language very harsh. Mr. Linton exhibited his collection of relics, which certainly is very interesting and includes some rare specimens of the former civilization. We learned quite a bit concerning the natives' customs from them.

Had lunch with them, and afterwards returned to the boat; changed clothes and went hunting. Mr. Beck went up the Tahuku valley, while I took the coast road leading eastward. Saw plenty of white terns, heard several warblers; shot but one female fly catcher and a tern. Could not call doves, though I heard plenty and saw a few. Could not get shots at warblers, or when I did, the auxiliary proved defective. Three caught in trees and I could not get them. The Myna bird has been introduced,--it is said by former German farmers; how long will the warblers be singing about the houses? Returning, I flushed a pair of

January 30

Mr. Beck and I went ashore at eight o'clock by our time, and found that they are some forty minutes ahead of us here. Went on over to the Americans and found that the Administrator could not meet us until ten o'clock. So I set to work on the dictionary, and by lunch time had succeeded in getting through it, and in looking up some useful words in the way of colors and conversing birds. Considerable similarity exists between this and Tahitian, with the addition of "K" here, which makes the language very harsh. Mr. Linton exhibited his collection of relics, which certainly is very interesting and includes some rare specimens of the former civilization. We learned quite a bit concerning the natives' customs from them.

Had lunch with them, and afterwards returned to the boat; changed clothes and went hunting. Mr. Beck went up the Tanuku valley, while I took the coast road leading eastward. Saw plenty of white terns, heard several warblers; shot out one female fly catcher and a tern. Could not call doves, though I heard plenty and saw a few. Could not get shots at warblers, or when I did, the auxiliary proved defective. Three caught in trees and I could not get them. The Syrma bird has been introduced,—it is said by former German farmers;—how long will the warblers be singing about the houses? Returning, I flushed a pair of

doves, wounded one and could not find it; also, a little farther, two kingfishers, wounded one and could not find it on account of darkness.

Did not get in until about seven. Mr. Beck had obtained one dove and several fly-catchers, including one black and white variety. I skinned at two fly-catchers, but was tremendously slow with the natives poking their heads over the hatchway and laughing at my inability to work like Mr. Beck does. The day's work was extremely tiring and a good sleep would have been greatly appreciated, but I slept very poorly and was bothered considerably by coughing. The hiking and plenty of sweating is improving that malady, however. If I don't relax into inertia when we put to sea again it'll be all right.

January 21

We took to the field at six this morning, going the same directions. I had somewhat better luck, obtaining three doves, three warblers, five fly-catchers, and four white terns, one of which was a splendid juvenile plumage stage. Was able to call three doves within shooting range today, which is somewhat encouraging.

Returning to camp I stopped at the native hut where I had turned inland the previous day, and received additional information regarding native names. Also was rewarded with an exhibition of a carved bowl and a drink of delicious green cocoanuts, which made the seventh one I had drained during the day, for I brought the Tipi today instead of the canteen. A swallow along the road was so tempting that I used three auxiliary cartridges in an attempt to bag him, but was unable to hit the rapidly darting little fellow.

At the schooner I indulged in a good hot bath, and was

at dinner when Buro got ready to go ashore. Was going to send a message with him to Linton regarding my going into mountains tomorrow, but Mr. Beck advised that I go see him myself. The walk from and to the boat was very trying after the day's hike. Arranged to meet about seven o'clock, or wait until he called.

January 22

I should have waited until Linton called, for it is considerably past seven o'clock and he is not here yet. I could have skinned out one bird, and I need the practice, though as Mr. Beck says, the one bird doesn't help him much, as it means but fifteen or twenty minutes of his time. He obtained a series of about ten of the black and white fly-catcher, which at first we thought an albino phase, but which proves to be the female adult. The notes question such a phase but this certainly proves it. The males are jet black, the young birds being brownish. The warblers are, if anything, somewhat more yellowish. The doves, called "Kuku" by the natives from their notes, are more attractively colored than the Tahitian species. The cap is whitish and yellow fringed, throat grayish, back green with brilliant blue in wing coverts, tail tipped with yellow, under parts yellow, with a salmon red on the breast which is very striking. The beak is green-tipped with a brownish-maroon nostril, eyelids red-fringed, feet red. The other species is red-capped; we have not found them yet.

It looks as if I will be hiking during the very hottest part of the day, and it does get hot here. Water is extremely scarce. I brought two canteens. About eight o'clock when Linton arrived. It was not so hot because he insisted upon my riding two-thirds of the way. We soon reached my camping place, and I urged Linton to remain for lunch.

He agreed, and the first thing he asked was if I was ready to tackle climbing the cocoanut tree. So I did, although it is a considerably higher one than I ever climbed before. I found the main trouble was hanging on with one arm while twisting the nuts loose. We had six good ones and I drained two broken ones besides. Two of them we used at lunch, where we had the company of a native, with whom Linton dines when in his valley. He informed Linton that the people he wished to see were sick and away from home besides. So Linton remained with me until about four o'clock, and then carried six doves, a warbler and two fly-catchers back to Mr. Beck. My calling doves up here has been very successful today, much to Linton's delight.

After he left, I took a side trail into the gulch west of this ridge and obtained three desirable brown fly-catchers, one warbler, and two doves, though I should have had several more doves. At camp, where I returned about dusk, I built a lean-to and bedded it with Burau leaves. Had a job starting a fire, but finally succeeded in getting some old rotten stumps and logs to burning. It soon got so hot that I had to move fifteen feet away.

There has been a rat in the mango tree all evening, but he is very quiet at present. I have a trap out for him.

We took a side trail east of here, down a little vale until we got well below the fern belt. Then by climbing the ridge we obtained a marvelous view of a broad intricate series of ravines leading into the main one, all with about the same V-slopes and wooded below, while the intervening ridges were fern covered.

January 23

During the night some wild horses came into the circle beneath the mango tree where I was camped. They left in a hurry when I very noisily revealed my presence. Later, my whistling bird of last night, with others of his ilk, raised the woods with their chatter. I dressed and tried to stalk them, but was not able to do so.

Trail to Haniapa from Atuona; branch trail to Puamau. Gillitout came along just as I was ready to start hunting and informed me that red-cap doves were present about one hour's jaunt along the trail. I went with him to forks of trail, and then proceeded to "jaunt" along the branch leading to Puamau for at least an hour and a half. Saw a red-cap fly over the ridge, but the trail failed to strike the stream; but water being present (Honamate) in the head gulches of Honamate valley, I descended and drank; tried calling, but only obtained one white-cap, and two fly-catchers, and a good big drink.

Returned along trail and obtained several warblers. Stopped at camp only long enough for lunch, and then shouldered my bed and beat it down the blazing hot fern ridge trail. A rooster crowing in a side ravine detracted me once, but failed to flush him from guava bed. Scared up a dove, but missed a perfectly good close auxiliary shot at him.

The boat was at the Maxwell wharf, but no sailors showed up for an hour. Bathed my feet in salt water while waiting. At the ship everything was locked up, but I took a bath and tied pajama coat around my loins, and took to the Captain's hammock. Just reached ship in time to miss a heavy shower. Beck and I went ashore and had a splendid dinner (chicken, fresh beef, and Christmas fruit cake) with Linton and the Handys. Visited until about nine-thirty. The boat being ashore,

we walked around the bay and came aboard with sailors.

January 24

Came ashore, and with Linton and his guide Fiu ascended Atuona valley after red-caps and swifts (?); but not finding food for doves, he did not even call for them. We did succeed in getting a blue kingfisher and downless young there. In next valley obtained a green species of same.

Climbed to a typical old Marquesan house built on a rock foundation. There we ate lunch. While I was trying to coax a young fly-catcher, Linton and Fiu proceeded to shoot the male behind me, and scared away the young. After lunch we proceeded to an inhabited house, where information regarding kukus was plentiful. Also assistance in finding them after we started out again. Our already too long cavalcade of three shotguns was augmented by another gun, three men and five dogs.

As we crossed a ravine, we observed three doves leaving the "food tree" and flying high up the valley. Here beneath the "food trees" we are now waiting for kuku to arrive. Fiu completely missed the first bird, and later our other guide missed one. I blew one to pieces, so then climbed up cliff and used auxiliary. Hunted there about an hour, native style, beneath a food tree, calling. They use a monotone whistle, and get fair results. Returning across gulch, I tried to drop a swift, but failed. Succeeded in winging two white terns, greatly to the amusement of the natives, who know nothing about wing-shooting. Also killed a swift as we descended the ridge, but missed two others. The swift was feeding upon termites and flying ants beneath mango trees. Stopped at Linton's for refreshments

and to run over bird names with Fiu, who shows good promise as a guide to shearwater nests.

January 25

In spite of a very stiff and threateningly sore knee, I came ashore today, and Fiu and I are on our way to a burial cave, where I am to take only birds and nests, not bones. Warblers singing. Stopped and picked some small sour oranges, and later peeled and ate a sourer green regular orange. We shot a black flycatcher and at a warbler. Left grub and extra luggage at trail and proceeded up side of ravine to the "Ropia" cave, which consisted of a hole in the rock, 10X15X5. Deep in it were nine nests of moss glued to rock with saliva, and numerous swifts flitting about. Here was a chance for some real shooting,-- what could I do? Well, I wasted several auxiliaries at the birds flitting in and out of the cave and amongst the trees. Then I turned my attention to those flying in about thirty feet square of sky space over head. Bang! Bang! Bang! and the cliffs but echoed bang! Bang! Bang! Wonders of Jehova, one of the little cusses lost a feather! Bang! Ah, Kopia topa and just at our feet. One bird out of ten shots, and five shells left! Fiu after finding four young birds "Kopia tauu" in nests, had proceeded to walk up the steep slope of rock a little on one side and I later heard him above me. He reported no "tauu" in the cave up there, but thinking I could probably do better shooting from another stand, when he came back, I signified my desire to ascend. He pointed at my shoes and the rocky slope, and well he might, for those naked toes of his clung like fingers to each protruding boulder in the volcanic conglomerate. But when he offered to carry both guns, I went along readily and safely enough with both hands free to climb with.

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There was quite a drop of perhaps twenty feet down to the ledge below the upper cave. I manipulated that by having him cut a Hibiscus sapling long enough to reach to the bottom and have the tender top wrapped and tied about the base of a live sapling at the crest of the cliff. He came down with my gun by those enviable toes. There we shot away the rest of our ammunition, dropping two birds over the cliff below, one of which we later found by dropping a white tern near it. One was dropped safely enough on the ledge we were on.

Returned to our outfit, and soon after arrived at a stream where we lunched. Proceeded thence to climb a ridge farther east at the one thousand foot level of which is an ancient House Paepae, Maupi tree, and "Kuku kiki". Fui called three doves and I got them all; one has a green head. Cocoanuts grow well and bear luxuriantly at high levels here, bless them! What a godsend they are to a hot, sweaty, thirsty climber!

Fiu called from below the kuku food tree. I had seen no doves, so I went down there and shot the farthest one away,--"Kuku pukioe", Fiu called it. It appears to me to be but the young juvenile plumage of the white-cap, especially because of the fact that later,--for we returned to our observation post above and sat there until our shells ran out, obtaining ten birds all told,--three others showed stages of becoming white-capped. The rest of markings very similar except for lack of brilliancy.

Fiu climbed a tree and dropped half a dozen or so very large green and delicious cocoanuts. Four of them we disposed of before leaving; the rest I buried against a possible return on the morrow. Provided my knee is bendable and Mr. Beck willing, I will endeavor to be at Fiu's by seven, else he will be gone to make Copra.

Along the journey home he had to stop and tell all the natives we passed about my rotten wing shooting, which he thinks marvelous. He missed two shots that I let him take at doves, while I dropped one hundred per cent. with number eight shot at perhaps forty yards, missing one but getting two. I missed one with number ten, also one with auxiliary. We obtained one more on way down. Stopped briefly at Linton's and Handy's and at store for hats to lose overboard on rest of journey.

Mr. Beck returned very late with three red-headed doves, two swifts and others, having gone farther in one day than I went in two. But most of mine was on the second day, and I stopped longer to call doves. Skinned three flycatchers in about two hours and a half.

January 26

My left knee shows symptoms of the same trouble which affected the other. Slight shocks have been detected since Friday, when upon kneeling down to shoot a bird, several thorns of the prickly Pandanus penetrated the superficial stratum. Apparently one thorn reached vital regions below, and trouble is expected in the vicinity.

Remained aboard today skinning birds, getting eleven doves done. Mr. Beck went ashore in afternoon and obtained seven swifts.

January 27

Remained this day on my mattress. I tackled four swifts this morning and made no very great blunders; also used no more than one hour each. But in the afternoon when Beck returned with two doves, two warblers, seven terns, a tatler, a heron, and two yellow-bill boo-

bies, I was but able to do up the tatler and four terns which he skinned the bodies out of.

January 28

Spent the morning watching Mr. Beck skin boobies. If they take him one hour, how many can I do in a day at one to four hours?

We set sail between ten and eleven; I don't know just when because I moved down to the Captain's cabin.

January 29

We are making but about eighty-five miles dead before a very light breeze, which means two weeks to Christmas Island, although with good wind we should make it in one week. As I tell the Captain, I don't care how soon he gets there, just so long as he waits until I'm well able to walk about for the hunting. I hoped by the time we arrived there to have accomplished something in the line of studying and writing; but what with the disconcerting, indisposing bronchial trouble on fore part of voyage and this knee trouble now, all I can do is sleep during the daytime and lie awake at night. I thought by remaining below in a cabin this trip and avoiding the piercing sea breeze, no matter how hot it may be, I would escape a return to the hacking cough; but today, just before ten o'clock, I coughed for half an hour as badly as ever and had a tendency to choke up in my bronchial tubes. What a man was R. L. S. who, with a real ailment, could write as he did! The slightest cold knocks all the energy out of me.

An impression of the few survivors of the Marquesan race,--Linton and Handy say they will last perhaps ten to fifty years more in the pure blood,--is hardly to be expected from a very busy week spent

at one place. Nor is this to be taken as anything so presumptive. At this point, however, comes vividly to mind the absolute and utter failure of the Polynesian missionary. True these races have, without exception, acknowledged Christianity as it is presented to them. Some of them no doubt believe as sincerely as the missionaries themselves. But while professing such a Christian belief,--and that is all a lot of Christians require,--they still believe firmly in their old "tabu". Here just the week before our arrival, Linton tells us, a native having promised to show someone the main sacred burial ground or temple on Hivaoa, preceded the trip by one himself, probably to hide anything too readily portable. Sunday he failed to show up to conduct his party, and two or three days later he died. His wife informed the white man that her husband had gone alone to the place Saturday; that he had informed his son about seeing "long-tailed mane" following him back down the trail; that he was perfectly healthy, and had simply died as a punishment for being about to break the great "tabu". The same man was a good church-going Christian. But how we must admire them for refusing actually in their hearts to deny their gods! The religion of their ancestors, which is about all Christianity means to most of us, is too firmly rooted to be shaken by a little preaching, and I, for one, certainly admire them for it, especially those who so artistically adorn themselves with the old pagan tattooing. I hope to get some good sketches of the designs when we return here. In this again we find a retention of former beliefs in spite of present teachings.

There have been sharks following us, for we are traveling very slowly with a very light breeze. Jean says five were seen at once. The Captain just now roped one a little larger than mine, and I saw a still larger one following us. (In spite of my knee I went up to watch

the fun for a few minutes, but soon returned with my ailments.) We are now passing a large flock of fishing birds. By all the superstition of the sea, we should now get a good breeze, unless it be necessary to catch all the sharks following the ship first.

But to return to the last of the Marquesans! From all the information I could obtain during our short visit, from the variable sources of degraded white trash here for a life of ease and dissipation, to scientific research workers, and including talk from the natives, I take it the Marquesans are, if anything, less moral sexually than the Tahitians. Yet they profess Christianity, and in their outward actions are the very extreme of personal modesty. Yet the promiscuous intercourse amongst them is far-famed, and no doubt accounts for their rapidly decreasing numbers. Two thousand, at best, of full-blooded natives now exist, according to Linton and Handy.

As for their Islands, judging by Hivaoa, they are the least developed lands of opportunity I ever saw yet. Cocoanuts grow and bear well, and are exceptionally good at altitudes as high as twelve hundred feet. The trees bear in many instances more than one hundred nuts, while the meat is thick and of a very good quality. This is so noticeable that all the traders blame it for the indolence of the natives, who can produce so much copra with a day's labor that the rest of the week is play time for them. Business men call it laziness, but I call it good philosophy. What more does an animal want than a good living and safety? Lacking intellectual advancement, there is nothing left for them.

Mr. Beck found coffee, bananas, mangoes, and cocoanuts growing so closely that they touched. Vanilla does well and is not yet

infected here. Cotton is wild all over the island, but I saw none cultivated; guavas have formed dense thickets; breadfruit does exceptionally well and seems to have been the staple product of the old diet. They pounded it into a mash, pressed it into large cakes and buried it in large holes until it fermented to the right stage. This made a very "filling" food which they enjoyed; "mapi", I think they called it. Of birds they ate the doves, and if ever they were here, ate up all the jungle fowl. Fish were plentiful and considerably eaten.

January 30

We have but a slight breeze this morning. I told the Captain he should have caught one of the largest sharks and we'd have had a gale. But the ship moves along pretty well at about three and a half knots. There may be islands visible from deck, but I fear I've seen the last of them until Christmas. Well, they addaa little point of interest to the seascape, but we should worry about scenery when we have this marvelous ocean to look upon.

The most sport I have had for a long time was tonight when, unable to go to sleep because of the bothersome cockroaches, I turned hunter. With a block of wood I have patiently awaited their advent and then squelched them. It is somewhat consoling to hear their death crunch after they have nibbled your feet and crawled over your face during the night time. I know I have disposed of a dozen at least tonight, but the supply from cracks seems inexhaustible. How well Nordhoff describes the odor of old copra and crushed cockroaches! It is not at all an appetizing aroma. Yet we have, no doubt, one of the very best schooners in these seas.

January 31

We are traveling at a rather brisk pace for us, and if the breeze continues well we'll cut a few miles off the long course to Christmas Island.

It seems we made fair progress today, and at this speed will reach Christmas Island in six days' time. Well, I think I shall be well enough ere then to at least skin birds. The ship certainly has done some lusty rolling, on and off throughout the day. Thank Neptune for good semi-circular canals! His sickness is not added to my list, at any rate.

My cough has not developed at all this trip; in fact, I think it quite departed, and so intend to tackle top-side in a day or two if my knee continues improving at the present rate.

February 1

We certainly are having marvelously good weather. Sailing NW with the wind on the starboard beam. There must be a considerable current aiding our course, for we have made such progress that the Captain suspects his chronometer's accuracy. We will be at Christmas Island in short order at this rate. Birds are rather scarce here, yet we saw this evening two shearwaters and a sooty tern, showing that even here the air is not forsaken. What wonderful air it is, too, after a few days in a cabin, sweltering in sweat and stifling in copra scent and cockroach odors! Now for a change; give me fresh air if it give me bronchitis or any other itis!

The gentle lapping of the undulating waves and the creaking of the masts is music in my ears,--considerably more so than the

January 31

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It seems we made fair progress today, and at this speed will reach Christmas Island in six days' time. Well, I think I shall be well enough are then to at least walk about. The ship certainly has done some lusty rolling, on and off throughout the day. Thank Neptune for good semi-circular canals! His sickness is not added to my list, at any rate.

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We certainly are having marvelously good weather. Sailing RE with the wind on the starboard beam. There must be a considerable current aiding our course, for we have made much progress that the Captain suspects his chronometer's accuracy. We will be at Christmas Island in short order at this rate. Birds are rather scarce here, yet we saw this evening two albatrosses and a sooty tern, showing that even here the air is not forsaken. What wonderful air it is, too. After a few days in a cabin, sweltering in sweat and stifling in coppra scent and cocoanut odors! How for a change; give me fresh air if it give me bronchitis or any other ills!

The gentle lapping of the undulating waves and the creaking of the masts is music in my ears,--considerably more so than the

discords the Captain is now producing on his saxaphone. In the west the sun is setting in a purplish-golden haze beneath a few flat-bottomed, roll-topped, leaden clouds. Tonight slumber can keep distant if it so desires, for instead of stalking roaches I'll be gazing at the stars. We are within 5° of the line which we crossed two or three degrees in reaching our destination.

February 2

Awakened at four, and being unable to sleep came up and watched the stars, waning moon, and waves until daylight. As for the stars, my admiration goes completely to Ursa Major in preference to . The Southern Cross is interesting mostly because we northern people seldom see it. Here along the Line the two are at the same time visible and therefore comparable. The Dipper is larger and more prominent, probably because in a less dense portion of the sky. At any rate, it has a home-like appearance and certainly looks like a good old friend. I am expecting to make out the Polar star at Christmas, though two degrees may not be sufficient to raise it above the haze of the horizon. Deflection of the atmosphere may help some. The sailors seem pleased to see me, and their greeting of "Oraali", oft repeated, is very amusing. I exercised freely this morning, mostly arm and shoulder. We have our typical ocean clouds with their rolling tops, level bottoms and dark rainy appearance in shadow, but fleecy white and profoundly deep and beautiful where the sun shines upon them.

Toward evening I got my blankets above deck and found a spot well sheltered from the breeze to spread them. Less then three degrees from the Line, and two good blankets felt none too warm during

discords the Captain is now producing on his saxophone. In the west the sun is setting in a purplish-golden haze beneath a few flat-bottomed, roll-topped, leaden clouds. Tonight although can keep distant if it so desires, for instead of stalking Rosebes I'll be gazing at the stars. We are within 6° of the line which we crossed two or three degrees in reaching our destination.

February 2

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Toward evening I got my blankets above deck and found a spot well sheltered from the breeze to spread them. Less than three degrees from the line, and two good blankets felt none too warm during

the night, with the help of warm pajamas. But the air was good and fresh, and how pleasant the starry sky is!

February 3

A beautiful fresh morning, with just enough moisture to make the air feel brisk and bracing. I lay peacefully within the warmth of the blankets until daylight was well advanced. The moon is almost waned to darkness. The unlighted portion is distinctly visible just before daylight, although I have heard at times that it was not. The best crescent shape is seen just at about the time the stars of the first magnitude alone can still be observed. Before then the lighted portion of the moon is too bright and flaring. When toned down to a bright silver by approaching sunlight, it appears at its best. During the night some sooty terns were about us, crying a little. One I saw just before going down to breakfast. He made a very picturesque exhibition of tumbling for me, a strange feat in a seabird. How came they by such an odd characteristic? Is it merely a habit which keeps them prepared at all times to dart suddenly from their course and occasionally to continue down to the water and catch a fish? Was it that those which darted or tumbled most in all their flight became most proficient in diving for food, and hence survived over those which merely dove when food was to be had?

At ten o'clock Mr. Beck shot a bo's'n bird, which not being hard hit fell not, but being sorely hit took to the sea a little ahead of us and but slightly off our course. With the Captain's permission and guidance, the ship was deflected so as to run her down. I believe all hands, including the cook, were ranged upon the star-

board rail from bow aft. When approached within reach, Mr. Beck again shot. A sailor on the rigging below her bows caught the bird securely enough in dirty hands (more's the work for the skinner), and saved the rest of us getting wet, for we lined the water line and I, for one, was prepared to even disobey the Captain and make a lunge for the bird, should all else fail. Well, I might have quailed at that when it came to the act, but there's no telling. A sailor is now weaving us a landing net, which will mean birds for me to skin hereafter, but not so much cleaning of their feathers.

This is one of that species which produces the long red tail feathers, so much admired by native and French girls; though this particular bird has not much tail upon it, the one feather having barely started to grow out, and the other but little over six inches long. Mr. Beck has taken them with thirty inch feathers. This fellow has a bill quite lacking in the reddish color supposed to be characteristic. It is horn and yellow colored. The bo's'n bird's bill very nearly approaches a toothed condition by the regularity of small notches on the inside of the edges of each mandible. These point backward, and no doubt prove very effective in holding fish. This bird is mottled, or spotted,with black patches on the back, and the wing primaries have black upon them. There is also black about the eyes and sides of the head. Colonies of lice are so thick upon these birds that patches of feathers appear gray colored in consequence of their presence.

We are daily getting into stronger easterly currents, such that carry us many miles,forty and the like, eastward of the course we steer. The breeze is but a gentle one, but catching us abeam suffices to take us along fairly well. A few more days, and we'll be near

Christmas. At present, Malden is our nearest land, and it is a good three hundred miles away. No wonder birds are not very thick! The marvel is that we should find any at all.

In spite of the lightness of the breeze, we have made good time since we got away from the influence of the Marquesas Islands, and caught the strong westerly current. Our runs have ranged from one hundred and twenty-five miles to one hundred and sixty-five miles per day, and at this rate Sunday evening should find us anchored at Christmas Island. Today we were more than three hundred miles from any island, Malden being nearest at three hundred and twenty-five. This afternoon, with more than considerable help from Mr. Beck, I skinned the Tropic-bird, and for dinner we tried his flesh. It was a very dark meat of a poor duck, or mudhen quality, though the Captain seemed to relish it, and slicked up the gravy with his bread. There is no reason why a man should starve where their young are obtainable.

February 4

We have a delightful change of scenery this morning. The clouds are of quite a different nature to the former ones, which have been about the same since leaving Marquesas. Now they look more individual and squally, with a new tone of gray-blue haze beneath them. A fitting and well matched border they make for that encircling band which separates the empyreal blue of the sky from the cobalt blue of the rather quiescent ocean. Not a glassy calm, but just the slightest of ripples without the faintest white cap.

We did not make much of a run today,--less than a hundred miles; but we will reach Christmas Island Tuesday, it is expected. The

clouds today have an entirely different aspect, and in all probability we will be driven below decks ere morning. Practically the whole empyreal dome is lightly fluffed with rainy looking clouds, with but hints of blue sky here and there showing through the less dense patches.

They tried to make the engine run today, but failed,--a good thing we needed it not seriously. But now we are gliding steadily along before an aft breeze, which should give us good mileage at tomorrow's reading. Here we are feeling some wonderfully great swells, which, no doubt, come from afar off and are not hindered by islands within hundreds of miles. There are, too, of course the smaller ripples of the local breeze, but the motion of the ship is a slow and graceful rise and roll to the great swells.

In the west the sun is sinking in her usual golden robes. Tints of lavender touch the leaden clouds and contrast the blue patches. A line of flacculent ones just below the main mass are a brilliant lustrous metallic gold, hanging in a background of copper gold. The horizon is a perfectly level and even dark line, with but now and then a wave visible against the gilded sky.

A Tropic-bird, red-tailed, came over the ship today, but failed to place properly for a shot. We have a nice new landing net all in readiness for them too. Well, we should get some tomorrow, and plenty the next few days as we approach the Islands.

February 5

I tied the offal to a line and am dropping it astern with hopes of attracting sharks. Mr. Beck thinks it may be the reason three shearwaters have come up from leeward. The tubinares, Mr. Beck thinks, scent their food to a considerable extent, which may account

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for the development of the tube-like nostrils in that order, a thing to watch in skinning for a comparison of the size of eyes and brain lobes. The large Tropic-bird we killed, for instance, has an eye-ball fully this large, while her brain capacity was considerably smaller than that of the Myna bird. Bk. 10, p. 1149

The one obtains its livelihood by craft and cunning, and has had to develop cleverness to preserve its life; while the other has obtained its food by eyesight, and flight alone has preserved its life,--flight and the inaccessible islands and cliffs of its nesting habitats.

To return to the mutton: the sailors drag the hide until it is well washed out, and then stretch it on sticks and hang it upon the guy-cables to dry, wool outermost. I am anxious to see what sort of a pelt it makes of it. It is too bad we are not ashore, for I would like to see if Tahitian culinary art could make this old ram edible. A billy-goat in as poor condition is the only thing I can imagine that would be a stronger test. Well, I'm thankful I have sworn off on eating proteins, for certainly this will be the limit.

There was a little blue wasp here, with a triangular abdomen and very long antennae and rear legs. Mr. Beck and I pleaded for its life on the theory that it killed small cockroaches and flies. But the Captain came forth with the story of how small wasps get in children's ears and refuse to come out, causing much trouble and pain. I wonder how many times it has occurred; probably once,--that is enough to start an idea in a place like Papeete.

Birds begin to show up a little more numerous, and come in small groups, not singly, as is their wont far out from land. Our

run today was not very much, in spite of our good breeze last night, and the strength of the current these past two days has dwindled.

February 6

About midnight the sky was well clouded over but no rain fell until shortly after four, when I piled my bedding through the cabin hatchway and went below to eke out the morning hours with snoozing. This morning we are threatened with calm conditions, but as yet there appears to be enough breeze to keep us creeping slowly along at perhaps two knots. Large swells with but very light ripples prevail, while around us all seems peaceful and serene. These clouds very likely forewarn us that we are approaching the northern limit of the southeast trades and that belt of calms that exists between them and the northeast trades.

While looking through the glasses,--which will be paid for at the end of this month, and have already paid for themselves by the increasing of my vision sixfold,--at a bird, my view crossed the path of silver light leading across the waves towards the sun. Now there is something certainly worth the while of any man. Just to see those scintillating, flickering reflections rising and falling on the greater swells is a sight few people see, and less appreciate.

Afar off along the horizon a whale spouted this morning, but unfortunately was too far away to be seen himself. I think he was over the bow of the horizon. Wish he had been nearer to add one more paragraph to my letters, besides the pleasure of seeing him.

We are today well within the bird range of our destination. Saw one flock of a hundred sooty terns fishing, while smaller flocks and individuals have been quite frequent. A Tropic-bird and four

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magnificent Frigate-birds were just now our amusement. The red-billed and red-tailed bo's'n failed to place far enough forward for a shot. The four Frigates were cruising in battle array southeastward, where no doubt they already perceive that flock of fishing terns upon which they intend to prey like veritable pirates of the high seas.

A shower came at about nine o'clock, and has lasted long enough for everyone so inclined to get a good shower bath. Again comes the overly modest, almost shamefully modest nature of the Polynesians to view. Here is a schooner three hundred miles from the nearest woman, yet these men will not strip down to take full advantage of the shower, but remain hampered by overalls, or even pario. Such modesty most certainly is not virtue, because these same people are extremely remote from anything that can be called virtue, either in actions or in thoughts. Hypocrisy is all it is, to appear so modest and be so vulgar and corrupt.

February 7

I swung in the Captain's hammock last night fearing more rain, but the fear was groundless for the night remained clear and starry, with a moderate breeze so we made very good time. Mr. Beck having shot a tropic and booby yesterday, I had a plenty to do today. Washed the tropic which lit upon the sloppy deck after a shower while wet. The booby being netted, after the Captain had graciously swung the ship around by the use of the engine to him, was perfectly clean; but during the night and the skinning this morning he leaked considerably which necessitated considerable washing. The skinning does not take me so awfully long, even after this little practice, and I think at the end of our ten days at Christmas Island I'll be able to skin a

large bird in good time. The worst trouble with them is scraping the fat off the skin and washing blood and slobber off the white feathers. A sailor picked up the bo's'n bird and pulled out its one long tail feather--the other being in growth--but when I started searching for it, he produced it from under a box. That necessitated inserting it and sewing it in. The natives are particularly fond of these red tail feathers, the girls wearing them for hair ornaments.

Early this morning Mr. Beck shot another blue-faced booby, but I failed to net it. Others and Tropic-birds were about all day, but he has been unsuccessful in getting them. Well, there will be little time tomorrow for skinning, for at noon today we were on the latitude of the Christmas Island, and have altered our course to westward with sails spread both ways to catch the fair wind to advantage. But ninety miles to go, and daylight but eighteen hours away is not hard. Our progress since yesterday assures us that we are no longer in the doldrums, but are in the northeast trades.

We were out of luck at the bird collecting today, the two that Mr. Beck killed being missed by us astern with the net. This evening a school of porpoise ranged alongside, and the better to watch their antics, I came up to my favorite seat on the bow. But the setting sun forbids one to peer into the sea. On the crests of the waves, however, they could be seen swimming in pairs mostly, with their noses and dorsal fins cutting the surface of the water now and then, as they no doubt take a breath.

Mr. Beck spent some anxious moments with charts and calculations, figuring that we were due to strike the Island about midnight if our westward course were continued. It is an interesting

experience to feel the atmosphere at such an occasion. The jovial Captain, however, seemed perfectly confident in his calculations and purposed conduct of the ship for the night.

At nine o'clock I retired to the deck, but found it very windy and so a little uncomfortable during the night. At nine or so our course was diverted to northeast along which we sailed briskly until two A. M., when we swung around to the southeast. At six this morning, we again took up a due westerly course. Several birds were passing us early this morning; after daylight sooty terns, boobies, tropics, and frigate-birds were noticed. Laying off and on last night very likely returned us to our place of beginning, or very nearly so. Well, it kept us safely off the reef, and that is what we aimed to do.

February 8

The birds kept getting thicker all day, presaging our approach to land. What was our surprise, however, at noon when the Captain took his bearings, to find ourselves exactly in the center of Christmas Island, with no land in sight from the masthead!

Lat. $1^{\circ}47'$ N. Long. $157^{\circ}32'$ W . Whereupon the Captain decided that something must be wrong with his chronometer, and so he calculated our longitude by the correction of time according to the "Carnegie". That put us at Longitude $155^{\circ}53'$, and gave us thirty or forty miles to go. We had very poor luck and worse shooting and netting for birds today. Many were missed entirely, and most of those dropped were not netted. However, we got one blue-faced booby, which gave me work for the afternoon and tomorrow morning if we try to wash the blood off it. Our only other luck was a young red-footed booby

and four bridal-veil terns, beautiful little swallows of the sea with black above and white below, while a patch of white above the bill and across forehead is quite attractive. At five o'clock, Mr. Beck came aft from his shooting stand in the bow and told the Captain land was to the southward because the birds were heading that way. A sailor then espied the land SW x S, not very far away.

The engine was started, and we sailed westward until after dinner, when a sailor was sent up the mast. He immediately signalled land on port and starboard and dead ahead. So we were heading straight into that treacherous bay east of the Island, where, had we been without an engine, we would probably have had a time getting out tonight. One ship AEOW was wrecked by the strong conflicting currents there years ago. But our course was altered to NE x E, and the engine has boosted us well out of danger, I believe. So again tonight we are standing off and on, with the best part of tomorrow needed to bring us safely around to the anchorage.

How much more interesting the element of danger makes life! Last night and tonight,--for there is still the possibility of striking a point of the land which is very poorly charted,--were and are the most interesting part of the whole journey; except that other night when we passed near a reef island in the Paumotus.

To add a bit more to the excitement of the times, the boys just pulled in a large fish (Albacore) fully fifty pounds in weight, and at least three feet long. They have had large hooks, six inches long on heavy lines, dragging astern for days, and this is the first result.

Bk. 10, p. 1167 Skeleton

The streamline is certainly perfected by nature in the sea fishes which prey upon the smaller ones. It is surprising that such a small tail fin can propel such large fish with the speed that they make. I think I over-looked the fish one of the men caught a day or two ago. They were Bonitos playing afore the bow. So a sailor climbs out on the bowsprit and fished until he caught one. Hauled it up to himself and rammed his finger through its eyes to hold it securely. It tasted splendidly, and I expect this fellow will too.

February 9

He tasted splendidly in fact. The Captain and Titi had raw fish pickled in lime juice, with cocoanut sauce fermented, which is eaten by, or with, the fingers, necessitating the intake of considerable air at the time, with a noise somewhat resembling the exhaust of a Ford automobile. We had boiled and baked fish ourselves. While we were seated at breakfast, the trip line sagged and everyone commenced to shout the information that a large fish was hooked. He weighed almost three times as much as the other,--fully one hundred and fifty pounds. Three men dragged him in, but the fun was getting him aboard. A small line was noosed and slipped over his head behind the gills. Then everyone heaved, while Mr. Beck took a photograph. It was of the same species as the other. We stood off and on again last night, and this morning about nine o'clock came into sight of the Island on the northern end, where we desired to be. We are anchoring at about noon. Two people came down to the beach, seeing us, rushed back, and then again appeared and started upon a Marathon down the beach, no doubt to inform all the workmen that a ship had arrived.

Another fellow climbed up the flag-staff, and later a flag was hoisted, apparently British. Sooty terns are the predominating bird. Captain and I spent morning skinning birds. I made up two terns and one booby, besides taking care of five birds shot by Mr. Beck.

This morning I made good progress with a red-footed booby and two terns; also took care of several birds shot by Mr. Beck. The Captain did up two terns very well, and in the afternoon a red-footed booby. Mr. Beck is going to hire him to skin birds for us. Well, half a dozen or more daily will help a lot, and he learns very rapidly.

In the afternoon(we anchored at twelve) I skinned out two boobies, but made up only one because the other was so bloody, having been shot in the head. I shot away a full box of cartridges this afternoon and only netted six birds. But more than six others were good hits which failed to drift near enough for netting. And not a few of the rest were winged at least.

After dinner I tipped a booby's wing, and Titi and I went after him in the boat. After I had netted him, he crawled out of the net and flapped off a few yards, much to the amusement of those aboard ship. While I was getting to the other end of the boat with the net, and was out of reach of the gun, a shearwater flew over the boat. But I held the booby under water the next time I netted him, and he did not escape. Mr. Beck skinned out two terns much more rapidly than I did one; but I do not spend much more than forty-five minutes upon small birds now, unless they require considerable washing.

Mr. Beck went ashore, and reports warblers very different to ours of Tahiti and Marquesas. The sooty tern, which we have finally decided is the very common one here, with black wings, back, and tail and head, except a white patch across forehead. They are very abundant.

Boobies seem plentiful enough, shearwaters are here, but not numerous; a few Tropic-birds and Frigates.

Everyone is fishing, and we will have plenty to eat now; perhaps we should salt some down.

SUPPLEMENT TO BOOKS IX AND X

Voyage from Papeete, Tahiti, to
Christmas Island, via Marquesas.

Scientific Notes

Jan. 1--Feb. 7, 1921

January 6

Noticed that Mynas had full grown birds but were still feeding them by mouth. Also observed red-rumped weaver bird feeding three young by mouth upon grass seed. The young did not have the red above eyes.

Schooner "Moana" set sail from Papeete harbor at 4:20 P. M.

January 7

Light clouds, slight breeze. At four-forty saw a small flock of noddies just out of port.

5:57 P. M. Another flock of noddies with a few white terns, opposite Pt. Venus.

Ten miles ExN. Run 37 miles, NNE.

January 8

Saw a tern and shearwater off starboard side just after sunrise. Mr. Beck saw a shearwater astern about 6 A. M. At 6:10 a white tern crossed the bow. Shearwater to starboard.

7:00 A. M. Another white tern also two shearwaters, Nohua the natives affirm--gray above, white below.

12:00 M. Long. 151° 40' W. Paris. Lat. 17° 20' 15'' S.

Long. 149° 20' W. Greenwich.

4:00 P. M. A booby heading towards the NW. "Uao" the Captain called it in Tahitian. Island of Tahiti still in sight off about SW by W. Taravao end about S by W so we cannot be very far away from it.

Run SE x S 50 miles. NE x N 100 miles.

January 9

5:20 A. M. Sunrise clear, light breeze.

6:30 A. M. A booby passed headed SW. Far off the port side a white bird was seen traveling NE. May have been a tern, but reminded me more of the flight of the bo's'n bird.

12:00 M. Lat. 16° 03 S. Long. 150° 29' W. Paris. 18 miles NxW. Run 35 miles NE. 10 miles SxE. 20 miles NE x N. 7 miles SSE.

12:10 P. M. A large flock of boobies with a few white birds seen at horizon port side.

Maketea in view dead ahead NNE. A flat low island.

12:30 P. M. One, three and two, and one white birds observed from bow, latter a tern, Gygis alba(?).

12:35: A light colored booby crossed the bow.

1:05: Small flock of boobies on port horizon. One again passed near ship. Mr. Beck says red-footed. Another white

tern off starboard.

1:20 P. M. Five boobies hung around off the port side for several minutes; one quite a bit whiter of plumage than the others--wings alone really dark. Noddy and white tern off port bow.

1:50: Saw six blackish shearwaters. Two very near ship.

2:20: Three more boobies. One flying very near ship.

2:40. A very dark plumaged booby fooled closely about the ship. Mr. Beck came up to see if my shearwaters were not noddies, but none came around until he went below.

2:50. One shearwater off starboard. Not a noddy to my notion and best judgment. We are steadily approaching Makatea and should get close in before dark.

3:05. White tern crossed bow. Dark booby went ahead of us. Plenty of noddies here, and looking them over I'll have to retract my shearwater assertions. Noddies and boobies very thick as we approach land.

4:30. As we passed off the leeward SW shore numerous noddies, a few white tern and a different booby (Beck says the common one of India, Central America etc.) Also heard and saw several wandering tatlers along reef. Beautiful caverns for cliff nesting birds along here.

Shortly after leaving Makatea a red-footed booby passed the bow, two or three white terns, and noddies thick.

4:35. Two common boobies. White terns ahead.

4:45. They were accompanied by a few noddies and were diving frequently right where dolphins were jumping. One, then <u>three</u>

common boobies flying toward land, long low glides in troughs of waves. A flock of terns off the port bow; a very large flock of white and noddies and boobies. Six red-legged boobies went overhead. The three boobies above mentioned Mr. Beck thinks might be the third or blue-faced booby. Squall off port bow.

January 10

One bird off starboard side about 5:40, which even Mr. Beck thought might be a shearwater, but at 6:00 A. M. from my bow seat I saw half a dozen noddies off the port. Trees of the low lying atoll Rangiroa are in sight. We go to the windward.

Boobies and noddies plentiful. A few white terns.

We approached very near the island towards the fifth clump of trees from the east end, and then tacked SE. Almost as far as the glasses will show to the westward this longest atoll of the Low Archipelago extends with its stretches of broken coral between clusters of cocoanut trees. Noddies are the most plentiful but not very numerous.

8:00. We tacked off to the SE and passed through a large flock of fishing birds, noddies and boobies, with a few white terns, just before tacking back NE by N.

9:40. As we approached the easternmost cocoanut cluster, a long one, we went through another flock of fishing birds, above which soared a pair of those pirates known as Frigate birds or Man'o'war birds--a marvelous example of that science-baffling soaring where the birds not only travel but even elevate themselves

apparently without effort. There must be some muscular exertion. Anatomy would probably prove what muscles are exercised most in such birds. Four more of them above the island opposite our nearest approach.

12:00 M. Lat. 15° 20'. Long. 149° 51' Paris.

Noddies and fewer white terns prevalent all afternoon. As we were leaving Rangiroa I observed a frigate bird in his act of piracy. At first he was merely soaring around, but soon became more active and I noticed he was pursuing a noddy. After pressing the tern closely a few seconds, the frigate bird was seen to swoop downwards, and ere he reached the water he rose with something exceedingly fish-like in his beak. Here we find the sea-faring counterpart of that king of brigands, the American Bald Eagle, who in similar fashion, but far more dramatically, robs the osprey of its hard-earned trout.

Later in the evening Mr. Beck saw gray terns flying towards the island of Arutua, which came in sight just before dusk. We passed it on the leeward side, no doubt very closely because the water was quite calm where we were.

January 11

One or two squalls during night. At 7:00 A. M. a few noddies present.

A few noddies seen during frequent intervals all day. Mr. Beck says they are the lesser noddy. Three frigate-birds soaring above one flock.

Lat. 14°45'. Long. 148° 3' Paris.

Run: SSE 7 miles. NEE 70 miles. SE 5 miles. NEE 50 miles.

Passed well to windward of Takapoto atoll just before sundown. Considerable noddies (lesser) and sooty terns present in vicinity.

January 12

6:30. Saw some sooty terns and what I took for a shearwater.

Very few birds during the day. At 5:30 P. M. three sooty terns came near the ship.

12.00 M. Lat. 14° 18' S. Long. 146° 43' W. Paris.
Long. 144° 23' W. Greenwich.

January 13

6.00 A. M. One sooty tern near ship and three far off on the other side. Marvelous birds of flight they must be to come these hundreds of miles from the nearest island. Their wings are very long and narrow, and in the air they greatly resemble swallows in flight, though they are, of course, much larger. This one this morning darted about for all the world as if he were chasing insects.

One white tern just passed. I thought the three above were white too.

12.00 M. Lat. 12° 39' S. Long. 145° 50' W. Paris.
Run NEN 115 miles. Long. 143° 30' W. Greenwich.

No birds noticed during day. As we came up from dinner after five, a flock of terns was seen astern. Some white ones present, but mostly sooty.

January 14

Heard some birds during the night which Mr. Beck informs me were the sooty terns.

About 5.00 A. M., just as daylight was coming on, a bo's'n bird was flying just above the masts. Too dark to identify species.

5.40. Two sooty terns off port stern.

6.20. One shearwater (Ester) off starboard stern.

6.30. A sooty tern passed over the boat and flew around on exhibition for awhile. With their long slender wings flapped in quick quixotic, yet not rapid, strokes, they fly through the air with all the grace and charm of the kite. Now and then, for no evident purpose unless it be to add novelty to their flight, they make a sudden dart downward of from one to three meters, catching themselves and proceeding again in the regular graceful flight. Perhaps this darting is merely a method of developing speed in converting from flight to a dive for fish.

6.40 A. M. Two yellow-billed Tropic-birds passed over ship, following above long enough for us to plainly identify them. Later three were around the ship, and again three at ten o'clock.

12 M. Lat. 10° 48' 30'' S. Run N. W. 54 m.

Long. 145° 54' W. Paris. 143° 34' W. Greenwich.

Caught a shark this evening after an afternoon of calm, and an hour of engine trouble,--five gill slits, fore dorsal largest. Tahitian name, Mao, and for Remora, Oupumiti.

January 15

A pair of red-billed Tropic-birds present at various intervals this morning, accompanied by three white terns. Mr. Beck

shot one of them, but it fell just beyond reach from the ship. Later, a single Tropic-bird, red-billed, and two white terns were seen. What means this association? Mr. Beck also saw a Frigate-bird high aloft.

12.00 M. Lat. 10° 52' S. Run NEN 64 m.

Long. 145° 26' W. Paris.

143° 06' W. Greenwich.

1.30 P. M. A blackish shearwater was observed for a few minutes not very close to ship.

2.50. Several white terns, sooty terns, a few black shearwaters, and (three Frigate-birds) fishing here. The latter soared off to starboard and soon disappeared.

4.40. A scattering flock of white and sooty terns, a few boobies and shearwaters, with a pair of Frigate-birds near. One endeavored to scare a meal from a white tern before the ship, but neither succeeded in that nor in getting over the vessel for a shot.

7.30. A bo's'n bird came over the boat just after dark. Could see him by the light of the new moon. A good stiff breeze threatens to blow all night.

January 16

5.00 A. M. A booby abreast of the bow early this morning.

Mr. Beck reports seven different kinds of birds this morning, while I was below.

7.40. A black shearwater.

8.00. Two black shearwaters.

8.15. Tropic-birds, booby, white and sooty tern.

12.00 M. Lat. 8° 58' S. Long. 142° 31' 30'' W. Greenwich.

Long. 144° 52' 30'' W. Paris.

7.00 P. M. Boobies and terns about the ship this evening. Boobies flying above the mast at length, late into the moonlight night. The boobies seen today were all the red-footed variety.

January 17

5.00 A. M. One booby with before daybreak this morning. Four were observed astern just before coffee.

We have had a very stiff breeze ever since the night we caught the shark. At that time the Captain had remarked that catching the shark would bring the wind back.

9.15. Flock of boobies and sooty terns and white terns fishing, Frigate-birds above. As the ship approaches the flock the boys get out their fishing lines. One fellow hooked a good big fish of the mackerel family, very probably (Sarda chilensis) commonly called Bruito, skip-jack. This fish was about twice the size of the one caught last week, perhaps a five pounder. He escaped, as did all the birds, none coming above the ship.

We have swung around from our continued NNE course to SE. Lat. 7° 27' 00 S. Long. 143° 40' W. Paris.

141° 19' W. Greenwich.

10.30. Tropic-bird, three white terns and a booby.

11.40. Small flocks of sooty terns, white terns and boobies, occasional frigates, a few black shearwaters.

12.00 M. Lat. 7° 32' 00 S. Long. 143° 36' 00 W. Paris.

Long. 141° 15' W. Greenwich.

12.50. Two Frigate-birds soaring against the wind, one booby, yellowish-billed.

6.00 P. M. Boobies and sooty terns quite plentiful all afternoon; white terns and a small gray one occasionally noticed.

Sooty terns present after dark.

January 18

Sooty terns around before daylight. Five present at 5 A. M. Breeze very light and directly from east this morning. Engine being used. Course E.

With the sooty terns this morning we have twice noticed a bird somewhat larger than they and decidedly gull-like. Dark gray above and lighter below, throat whitish.

Black shearwaters--brown wing coverts--present occasionally. Flock of ten sooty terns came up astern, and, flying very leisurely, passed us. I noticed that when one made the characteristic dive of their flight, others near him did likewise.

7.00. A Tropic-bird, minus the bo's'n feathers of its tail, flew over the ship. They are probably moulting about this time.

7.30. A small white-breasted shearwater astern. Mr. Beck saw two of them last evening.

7.35. Small flock of white and sooty terns at distance north of ship fishing.

8.00. Boobies, both common and red-footed, commenced appearing and have been getting more numerous since 7.40.

Mr. Beck saw a petrel. We passed a flock of terns and boobies fishing, with a Frigate-bird standing by to leeward. Also saw a large black shearwater.

12.00 M. Lat. 9° 06' S. Long. 143° 21' W. Paris.

141° W. Greenwich.

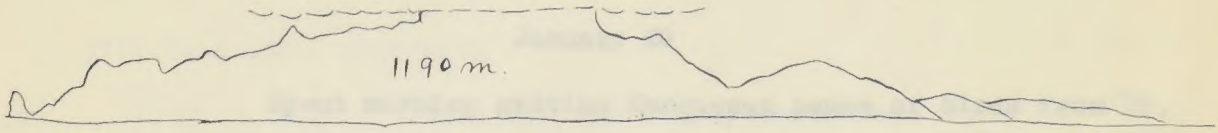
Boobies mostly yellow-billed, occasional Tropic-birds, sooty and white, and a larger tern present during afternoon at various intervals, a few frigates.

4.30. The islands of Huapu and Nukuhiva became visible, the former NE x N, its rugged peaks visible through the fog surrounding it. The engine was started and a course due east held throughout the evening.

Boobies and terns observed flying towards islands.

January 19

5.00 A. M. Island of Huapu lies N x W this morning, about twelve miles distant. The pinnacles seen yesterday are in clouds this morning. It is a very rough and mountainous island. The west end rises abruptly from the sea, but the east is more gradual.



5.40. The sun rose this morning between Hivaoa and Tahuata Islands E x S.

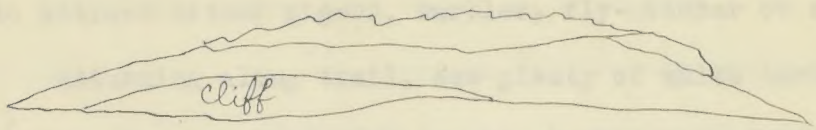
A white-breasted shearwater, sooty terns, and both red-footed and common or yellow-billed boobies apparently coming out from Huapu.

6.45. Sooty terns, common boobies, and a Frigate-bird.

White terns predominated today. A few boobies and sooty terns off and on, with occasional Frigate-birds. Mr. Beck thinks a

strange small tern was the lesser noddy.

As we approach Hivaoa, white terns more prominent, boobies more numerous, and when within a few miles, the noddy appeared numerous.



Hivaoa appears to have an overly large dry area below the upland forest where showers are perhaps frequent. Along the ridges grow Casurina trees and a tall stalky dry grass, and higher ferns. The coast is very steep and often precipitous. The cliffs continue into the water. There is no sign of coral formation about the island where we have been. Coralline algae and very minute forms of zoophites cover the rocks between tide marks, coloring them pinkish. Hulen valley, in the mouth of which we are anchored, is a typical drowned valley which is being filled in with sediment and has a beach extending across it.

January 20

Spent morning getting Marquesan names of birds from Mr. Handy of Honolulu Museum.

1.00 P. M. Mr. Beck went up the valley while I came along the coast road. The white terns are fluttering about the trees everywhere. Shot one: # not skinned ( ) Native called it "Kotae". Warblers were plentiful around Maxwell & Co. store. Shot a young flycatcher about two gulches beyond. A native further on called it "Omao" and added something more about "Komao-kokohuia". # 317. Flycatcher ♀ .

Native advised me to come up his valley for "Kuku"--doves. After continued calling, one has answered me. Their call differs decidedly from the "Upa" call at Tahiti, not having the altering notes. Failed to attract either pigeon, warbler, fly-catcher or swallow.

Returning along trail, saw plenty of white terns. Boobies above points. Heard a bird down towards beach which sounded gull-like. Scared up two doves along trail, wounded one, but could not find it. Later, two kingfishers with like result.

Myna birds are present in cocoanuts near the village. Strangely, the warblers are there yet. Mr. Beck obtained ten birds. One dove had eaten four red peppers.

January 21

Mynas and warblers very songful in cocoanut trees this morning at sunrise.

Shot some warblers in a "bayonet tree", but they did not fall out of leaves and I could not reach them. A white tern came over head and I shot him.

In next valley saw two doves, but missed one with auxiliary. Obtained two flycatchers # and # . Saw a black male with them. These birds are found in groves of Hibiscus, Guava and . The doves seem to frequent the Guava groves considerably. Heard a bird give a sharp whistle of three notes, but can get no results by calling it.

A few rods farther shot a dove. Iris: Olive brown, eye-lids slate with red lashes. Bill: Base and nostrils, brownish maroon, tip green with slate between it and above. The cap is white bordered

by orange, neck and throat lavender. Wing coverts and back green, with blue prominent in a few feathers. The breast is yellowish, with tips of feathers salmon red. The feet are red. Tip of tail feathers yellow. Was perched upon limb of Casurina tree. # .

Black flycatcher, # , obtained just beyond point before descending to cocoanut vale. They make a low clucking sound and are very readily called by sucking the hand. A bird here with a long sharp whistle answers, but not enough to reveal himself.

In the vale beyond the sea level cocoanut valley warblers were singing in considerable numbers. #

Turned up side trail here. Called doves to a clearing and shot one, # . Its mate flew away. Farther up the same gulch called another and shot at it with auxiliary.

Shot a white tern, probably young, sitting on tree branch. It hung by its feet. Flycatchers and warblers plentiful.

Went on up this trail to two mango trees, and then took trail leading off around hillside, descending to road without obtaining anything. Returning, however, I obtained three young male flycatchers, two warblers and a dove. Also got the young tern which is in a good juvenile plumage stage. I had to jolt it loose from the limb by a shot with a large shell. Had dripped some by the mouth. Warblers are certainly plentiful and have been singing gaily all day long.

Shot two white terns on the way in, to fill out number of fifteen. Was unable to get the only swallow seen today. Yesterday there were several swallows in that vale.

Stopped at the native hut and enjoyed the seventh cocoanut for the day. Also obtained the following information regarding native

names:

White tern ( ),"Kotae".

Young, "Kotae tanu".

Warbler ( ), "Komao kokohuia".

Brown flycatchers, young and female (Pomarea nigra), "Komao patiotio".

Black flycatchers, male, (Pomarea nigra), "Komao keeku".

White-cap green dove ( ), "Kuku Pukiki".

Green-headed dove ( ), "Kuku Pukio".

January 22.

Went up trail to Hauiapa with Linton to the summit of the so-called plateau; from the general level of the ridges it probably was one once, but it is now cut with deep V-shaped valleys with very intricate drainage basins. Along the trail beyond the ferns to where a wood of Hibiscus, Asurina and Pandanus commences and guavas. At a large mango tree just beyond the cocoanut tree, we stopped and made camp. Climbed the cocoanut tree and obtained six green nuts with water in them. Then we had lunch,--but first I killed a green dove, white-capped, near mango tree. A native arrived and we fed him too. He informed Linton that his people were not at home, so Linton turned back from his contemplated journey to the other side of the island. So he remained until about four o'clock and carried back with him six white-cap green doves ( ), one warbler (Conopoderas), one black and one black and white flycatcher (Pomarea nigra). Except for one dove, these were all killed within a hundred feet of the trail, most being called readily. There are rats in the mango tree tonight. I have the trap set.

Took a side trail down into wooded valley west of trail ridge and found warblers singing in most of the Pandanus trees; flycatchers present in dark and thick Hibiscus woods and doves cooing all around. Called several and succeeded in bagging two of them, besides three young flycatchers and one warbler.

Returned to camp at dusk. Warblers singing almost until dark. Doves stopped cooing shortly after sunset. A clucking followed by a shrill monotone whistle of two notes commenced about dark and continued several minutes. Might possibly have been the flycatchers. Have heard nothing since.

Today we came out upon a ridge point and had a splendid view across a broad cut-up series of tributary valleys, mostly wooded between fern-ridges. Occasionally out of the valleys would rise a green dove. He would soar high up in wide circles (irregularly) and when about level with the upper ridges would strike out across them. We saw several flying back and forth in this manner.

Swallows were present along the trail, and one near camp this evening. Also the white terns and a noddy were observed.

Barometer reading 1250 feet, though I neglected to see how it read at sea level this morning.

January 23

About two hours before the full moon set, I was awakened by the whistle of a bird. Hearing several, I dressed and tried to stalk them by moonlight; but I was unable to see them. Just at daylight the doves commenced calling and a little later I killed a blue and white kingfisher from camp. Had just finished eating when a

half-cast came along. He asked if I had any red-cap kuku, and informed me that about one hour's travel would get me to a valley where they were. So I put away the things and went with him to the forks of the trail, then I took the right fork and proceeded along it a good hour and a half without coming to any stream. But a red-cap crossed over from one valley to the other just ahead of me, and I could see the red-cap very plainly. I did reach water and a good healthy drink by descending a ravine. Obtained a white-cap dove therein. Also a black and white flycatcher. Shot one dove and two warblers along the trail going. Obtained several warblers during return trip, and some brown flycatchers.

Returned to ship about three o'clock.

Warblers very plentiful and singing all day. The two valleys which head just below a long cliff-like peak, one to each side of the island and on either side my trail, are regular choir juts for warblers. Doves and white terns flying about them. Just before last descent to sea level I heard a rooster crow in a small gulch, but could not flush him.

January 24

Linton, native boy, Fiu, and myself went up Atuona valley after swifts (?) or swallows and red-cap doves.

Saw a kingfisher about five hundred feet up valley, swallows and white terns above. Kingfisher nests in tree, three holes, empty, elevation 950 feet. Roosters crowing. Another kingfisher about 975 feet flush from tree with holes in it. Not shooting for fear of scaring away red-cap doves.

Fiu says the black and white flycatcher (Komao otue spirit) was "tabu" in olden times, and that those who killed it immediately got sick.

There being no "kuku" food above, we returned and obtained the last observed kingfisher, which had an insect or shrimp in its beak. Fiu climbed a dead bread-fruit tree trunk and found a downless young bird in the hole, which greatly resembles a woodpecker hole. Elevation 980 feet, not far from stream of water.

Dropped down and crossed to next stream, where at one thousand feet we killed one of the green kingfishers so common at Tahiti.

Climbed to an elevation of one thousand feet and stopped at an old Marquesan house built on "paepae" for luncheon. Shot a black flycatcher here. Fiu proceeded to a habitation to inquire as to the best place for kukus. When we left, three more Kunakis and at least five dogs and one shotgun--an old French 16 gauge--were added to our cavalcade.

Crossed ravine and ascended to a "food tree", 1050 feet, from which three doves had flown as we crossed the valley. The native habit of hunting "kuku" is to locate a "food" tree, and there remain calling until the doves appear. Fiu missed the first one and another native missed the second. I shot the third to pieces. Climbed cliff and used auxiliary on fourth. All white-caps.

Returning down ridge road, I obtained two white terns (378) ( ), and a little beyond, a swift. Missed two other swifts farther along. They were flying about beneath mango trees and the one killed had a mouth full of termites and flying ants. The

other two, when shot at, flew away towards the nearest cliff. Called "Kopia" by natives. Fiu promised to take me to a cave with their nests in it tomorrow.

Frigate-bird at end of bay. Tahitian name is "Otaho"-- white-headed. Two gray small terns.

January 25

This morning we came up a small ravine to an altitude of 850 feet, where the swift nests were found, nine in number in a small cave ten feet high, fifteen feet long, and five feet deep. Four of them contained young one in each nest. One young (Tanu) almost ready to fly. One (400) fairly well feathered; two in pin feather stage. (437, 438). I was able to drop one old bird from the small air space through the tree tops above. Also, Fiu obtained a young white tern from the tree tops just below cave.

We climbed up a rather steep slope of rock and by using a long Hibiscus sapling as a rope, descended over the cliff to the ledge above former cave and just below a hole in rocks about five feet in diameter and same depth, in which were several nests without young. Shot two birds from this place; one dropped far below, and another fell below. Shot a white tern and dropped it near them for landmark.

Obtained one very young bird in nest,--no pin feathers yet. Returned below after running out of cartridges, and found one of the swifts and the tern. Terns apparently feeding young about here, since most of them carried a small fish in their bill. Shot a brown flycatcher on way back to trail. Lunched where trail crossed stream

at 750 feet. Ascended dry ridge, ferns, guavas and scrubby trees, to one thousand feet, at about the eastern edge of the great bowl (semi-circular) which forms the Atuona valley.

Here Fiu succeeded in calling a pair of white-cap doves, which I bagged with one shot, much to his astonishment and delight. Shortly after this, he called one and I got it, (Kuku pukia). It had a perfectly green head, a blackish bill and less blue in wings, feet red, tail yellow-tipped, very little salmon red on breast. Maybe but a young bird, as the plumage appears rather "squabbish". We obtained three other specimens of the same kind, showing a decided tendency to blend into white-caps. Remained at this one sitting and shot ten doves. I missed three and Fiu two besides. Shot one more dove with auxiliary in guava brush down trail a few hundred yards. Nothing else observed until within house, when one swift was seen. Terns are, of course, plentiful.

January 26

Remained aboard and skinned birds. Finished loading copra today, and will probably sail tomorrow.

Yesterday and day before Fiu told me some of the traditions regarding Marquesan birds. "Komao otue", the black and white female flycatcher, was a sacred bird, "otue" meaning spirit. This bird was, therefore, "tabu", and anyone who killed it would immediately get sick, which may account for an abscess forming on my knee. This "tabu" may account for the present plentiful distribution of this species near the villages.

Another tradition was concerning Rupae, the large blue dove (Serresius galeatus), which is now found plentifully at Nukuhiva,

where also the sand fleas are very bothersome. Some great spirit drove the sand fleas from Hivaoa to Nukuhiva, and Rupae followed en masse.

In a Marquesan-French dictionary from which the words concerning birds were taken, "Manu Kaki oa", the Marquesan name of the Great Bear, translates "Bird of the long neck."

Fatuhuka, the bird island of the Marquesas group, otherwise uninhabited and very seldom visited, was in the old days "tabu" except when chiefs ordered a party to go after the birds from which bone instruments for tattooing were obtained. Consequently when a party one time landed there without authority, the sea rose up and destroyed their boat and drowned the leaders, while the rest remained marooned until a boat was sent for them. Although Fatuhuka is noted by the Pilot Book as inaccessible, Fiu claims to have been a member of a party who went there after the red tail feather of bo's'n birds.

Fiu gave me the following information:

Kaako: Ground burrowing bird in bushes on summit of higher ridges around Atuona Valley.

Kena: Bird that dives into the sea; very active in flight.

Keuhe (?): Call of Noha.

Koeva: Brown, web-footed, big as a chicken, like a heron.

Komao kokohuia: Warbler (speci).

Komao keekee: Black flycatcher (male) (speci).

Komao otue: Black and white flycatcher (female) (speci).

Komao patiotio: Brown flycatcher (young) (speci).

Kopia: Swift, also swallow, which are not distinguished as separate. (Speci).

Kotae: Small white tern, (speci).

Kuha: Small gray seabird described as a tern.

Kuku: The green doves, named from cooing notes. (Speci)

Kuku pakioe: Green headed. (Speci).

Kuku pukiki: Red-capped. (Speci).

Kuku maita: White-capped. (Speci).

Manu: Bird or insect.

Manuoko: (See puatea). Young bird flying with parents.

Kihu: Downless young; bare skinned.

Hov: With down.

Tauu: Feathered young. (Speci).

Noha: (syn. Mokohe, Uako, Vakoo). Brown(?), red-throated, white-breasted seabird.

Noio: (syn. Koio). Black bird with white cap.
(Noddy).

Pahi: Kingfisher.

Kihupahi: Downless young kingfisher.

Parara: Ground burrowing bird on Fatuhuka, very small. Bluish (maybe shiny black.--Linton).

Piho: Imported blue rock pigeon, or variety of it.

Puatea: Young bird in nest or tree.

Punake: Eats fei, looks like hen; has red, black and white feathers. On high ridges.

Taa: Very small cliff dwelling black seabird. Small as Torea.

Boobies: Uaa, (T) Sula piscator, red-footed, also Kena (Paumotu) Sula (cyanops) blue-faced.

Tavae: (T) Red-tailed Tropic-bird.

Kotae: Small white tern. (Speci).

Kuha: Small gray seabird described as a tern.

Kuku: The green doves, named from cooing notes. (Speci)

Kuku pakioe: Green headed. (Speci).

Kuku pukiki: Red-capped. (Speci).

Kuku maita: White-capped. (Speci).

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Boobies: Uaa, (T) Sula piscator, red-footed, also Kena (Taumotu) Sula (cyanops) blue-faced.

Tavae: (T) Red-tailed Tropic-bird.

Tevake, (Phaeton sp.): All Tropic-birds.

Tivitivi: Call of komao keekee. (Very close resemblance of sound.)

Torea (Tahitian), Kivi: Wandering tatler.

Tuki: Wandering tatler.

Upe: Like a small black chicken; Nukuhiva only.

January 27

Remained aboard skinning birds.

January 28

Set sail from Tuhuka Bay, Hivaoa Island, Marquesas Group, at 10:30 A. M. for Christmas Island. Confined to cabin with abscess on left knee.

12:00 M. Lat.

Long.

Run.

January 29

12:00 M. Lat. 9° 10' S. Long. 140° 24' W. Greenwich.

January 30

12:00 M. Lat. 8° 12' S. Long. 141° 34' W. Greenwich.

Run. 85 miles.

January 31

12:00 M. Lat. 6° 35' S. Long. 143° 25' W. Greenwich.

Run. 145 miles.

February 1

12:00 M. Lat. 4° 58' S. Long. 145° 40' W. Greenwich.

Run. 167 miles.

5:00 P. M. Two shearwaters, one sooty tern.

February 2

12:00 M. Lat. 3° 26' S. Long. 147° 33' W.

Run. 142 miles.

6:30(?) P. M. Mr. Beck saw two Frigate-birds very high above us.

February 3

5:40. A sooty tern came near vessel and gave a very pretty "tumbling" exhibition. They fly with sharp, impatient wing beats, well paused between, and as they flit along in this manner thirty feet or so above the water they will all of a sudden make a very quick "tumble" downwards, sometimes as much as ten feet or more. From this apparently unreasonable action they continue their flight as if nothing had occurred. The one this morning "tumbled" half a dozen times in a minute or so as he passed us.

Sleeping on deck I heard sooty terns once or twice during the night. An army blanket was not sufficient to keep me warm last night--just a degree or two from the equator.

10:00 A. M. Mr. Beck shot a red-tailed Tropic-bird (Phaethon rubricaudus). First shot only discouraged it until it lit. The Captain steered the boat toward him. Another shot finished him. A sailor grabbed him from the bow. One tail feather about seven inches long, other but rudimentary.

Had pan-roasted Tropic-bird as a side dish this evening. The meat is very dark, not overly tough, this being a young bird, and apparently relished by our Captain who cleaned up the dish. The flavor is somewhat like that of the mud-hen, but not equal to good duck. However, there is no reason why a person should starve where they are obtainable.

12:00 M. Lat. 2° 11' S. Long. 149° 42' W. Greenwich.

Run. 165 miles.

Nearest land is Malden Island (4° 03' S. 155° 01' W. Gr.) bearing 249°. About 325 miles distant. Christmas Island is 560 miles distant bearing 298°.

8:00 P. M. Heard some sort of birds, might have been Tropic-birds; doubtful.

February 4

Sooty terns and another bird occasionally throughout night.

6:42. A sooty tern flew steadily by us, intent upon his flight and not to be detracted by calling.

12:00 M. Lat. 1° 16' S. Long. 150° 53' W. Greenwich.

Run. 82 miles.

4:50 P. M. A Tropic-bird came over the ship but did not place for a shot, although we are now equipped with a very good landing net. Apparently P. rubricaudus.

Mr. Beck saw shearwaters today. Rather calm but a good SE breeze,--what little there is. Tried to run the engine, but it did not want to work. Clouded up about sundown.

February 5

Rained a little during night. Rain clouds in deep banks around horizon this morning. A good light easterly breeze. We are making good headway.

7:15 A. M. Saw a shearwater quite a distance away. No sun for observations this morning except a few brief moments.

7:40. A black shearwater port side, scooping up into the air a few feet above the skyline, then sweeping back down close to the waves. Mr. Beck saw another and thinks they have likely been attracted by the sheep offal I have dragging astern, for they came up from the leeward.

8:00. Two sooty terns at slightly different intervals near the ship. Both flying rather low down.

Clouds breaking up and sun now shining.

12:00 M. Lat. 0° 12' 00'' S. Long. 152° 01' W. Greenwich.

Run. 92 miles.

1:30 P. M. Bo's'n, red-tailed, followed briefly.

3:25. Tropic-bird crossed above the mast, flying rapidly northeastward.

5:15. Tropic-bird flew about ship for a brief spell, leaving toward north.

5:30. White-breasted shearwater, small.

5:45. Three sooty terns passed our stern flying rapidly NE x E.

February 6

Cloudy this morning; light drizzles since four A. M.

February 5

Raised a little during night. Rain clouds in deep banks around horizon this morning. A good light easterly breeze. We are making good headway.

7:15 A. M. Saw a shearwater quite a distance away. Too sun for observations this morning except a few brief moments.

7:40. A black shearwater port side, scooping up into the air a few feet above the surface, then sweeping back down close to the waves. Mr. Beck saw another and thinks they have likely been attracted by the sheep offal I have dragging astern, for they came up from the leeward.

8:00. Two sooty terns at slightly different intervals near the ship. Both flying rather low down.

Clouds breaking up and sun now shining.

12:00 M. Lat. 0° 12' 00'' S. Long. 152° 01' E. Greenwich. Run. 92 miles.

1:30 P. M. Bo'sn, red-tailed, followed briefly.

5:35. Tropic-bird crossed above the mast, flying rapidly northeastward.

5:15. Tropic-bird flew about ship for a brief spell, leaving toward north.

6:30. White-breasted shearwater, small.

6:45. Three sooty terns passed our stern flying rapidly NE x E.

February 6

Cloudy this morning; light drizzles since four A. M.

Heard sooty terns several times during the night.

6:20 A. M. Sooty tern came up astern but passed on ahead of us.

6:40. Five sooty terns flying low against the waves. A whale spouting or large fish splashing at a distance.

7:00. Several other sooty terns observed.

7:20. Four came up astern and two of them seemed desirous of lighting but went on. One was entirely black, perhaps young, though otherwise he resembled the sooty terns he was with.

7:50. A flock of fifty or more sooty terns astern fishing. A Frigate-bird passed us from NW x W, headed for the fishing terns.

8:30. More sooty terns, in pairs and small flocks fishing. Started using engine. Rainstorm in the north and ahead NW.

8:45. A red-tailed Tropic-bird came about the ship at length but kept well astern. Four Frigate-birds soaring southeastward in battle formation. A squall threatening.

8:55. Shower has lasted for more than forty minutes. Some sooty terns came up astern during it.

9:30. Still raining. Quit soon after.

10:20. Mr. Beck shot a bo's'n (P. rubricaudus) which fell upon the galley. A sailor plucked the one long tail feather, but gave it up when I searched for it. A little soiled on the back from deck dirt.

12:00 M. Lat. 0° 38' 00'' N. Long. 153° 31' W. Greenwich.

Run. 100 miles. To go 253.

2:00 P. M. Two Tropic-birds (P. rubricaudus) passed over ship but were missed.

3:20. A blue-face booby appeared, and about four o'clock

Mr. Beck shot him. (Sula dactylatra). Bill greenish-yellow; face (fleshy part) bluish, with slight hint of purplish. Legs purplish blue, feet lavender. Body feathers all white except primaries and secondaries of wings and inferior portions of scapula and retrices, or tail feathers, which are black. A long shot which barely got the bird,--he flew a hundred yards or more off the starboard bow,--and the use of the net in gathering him from the water left him very clean. We were unable to swing the ship near him by sailing, so the Captain kindly started the engine and swung around, and a sailor out on the for'ard boom with the net picked him up. An old bird in excellent plumage.

February 7

Good stiff NE breeze all night. At 6:00 A. M. Mr. Beck shot another blue-faced booby, but I failed to net it. Several boobies of this species about today. Also red-billed Tropic-birds.

Fair wind all morning. Fair weather. Run, 156 miles. To go, 9 miles.

12:00 M. Lat. 1° 34' N. Long. 155° 48' W. Greenwich.

12:20. Being on the Latitude of our destination, the course was changed from NW to W. with a fair wind. Fores'l aport, mainsail astarboard, we are making excellent headway with the strong current to help us.

Sooty terns, blue-faced boobies, and red-tailed Tropic-birds frequently near during afternoon. Saw one boobie dive into the water from thirty feet and emerge after quite a pause. Nothing visible in its beak; fish very likely are swallowed into the gullet as soon as

caught. With little paddling they rise against a good wind. Several small flocks of sooty terns flying westward this evening. A white-breasted shearwater off the bow, but we could not get him.

BOOK XI (and Supplements.)

Christmas Island
Feb. 10--Feb. 18, 1921.

Return Voyage to Papeete, Tahiti.

Voyage to Rurutu, Rimatara.

February 8, 1921.

Last night at about 9:00 P. M. our course was diverted from due west to northeast, in order to avoid striking the island during the night. At 2:20 A. M. this morning she was swung around to the southeast, which was held until 6:00 A. M., when the westerly course was resumed. Our position from Christmas Island is now quite problematical. How far did we go NE? How far SE? And above all, what was the strength of the westerly current during the night? At nine o'clock last night it was estimated that we were but thirty miles or so from the Island.

6:00 A. M. Numerous sooty terns, Frigate and Tropic-birds present; also blue-faced booby and black shearwater (cuniatus dark).

Blue-faced boobies, red-tailed tropics, sooty terns were plentiful all morning. Obtained one booby, but had bad luck with all others. Frigate-birds frequent, and two tried to scare food out of two wounded Tropic-birds which we failed to pick up. Saw two Gygis terns.

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12:00 M. Lat. 1° 47' N. Long. 157° 32' W Gr.(?)

Carnegie time: 156° 53'.

Theoretically we are at Christmas Island, but apparently something is wrong because the men from the mast-head have been unable to see anything of it.

There is a gray-backed tern along with the sooty boobies and Tropic-birds.

1:30. A flock of terns fishing northward with boobies and Frigate-birds. A shearwater crossed our bows; a freshly killed mutton might have attracted it. Observed a Frigate-bird pursuing a booby, but so far away that I could not observe the results of the chase.

Birds have been very thick all afternoon. Mr. Beck obtained three sooty terns and a young red-footed booby. Little gray terns have been seen, white-breasted and black shearwaters. About five o'clock Mr. Beck informed the Captain that "most of the Island lay to the southward whither the most of the birds were going". A sailor looking SW espied the first sign of the island, two long hillocks of sand which are now SE of us, with a series of hillocks all along the port side, a few miles distant. An enormous number of birds is off landward fishing, with some Frigates standing by high aloft, while others dashed into the melee of terns, boobies and what not to scare a meal from the lesser fishermen. We saw today, four terns,--sooty, bridal, gray, and white; two boobies, blue-faced and red-footed; three shearwaters, white-breasted, black, brown wing coverts; tropic and frigate birds.

At six o'clock a man was sent to the mast-head, and he signalled immediately that we were getting into that dangerous bay east of the Island. So our course was changed to N x E, which we have followed for two hours with a good east breeze and the engine.

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February 9

This morning after standing off and on NE and SW, we sighted the Island off the port bow at nine A. M. This time we are around the north side of it, where a long sandy beach backed with cocoanuts makes a good landmark. While we were at breakfast, the men caught a still larger Albacore weighing at least one hundred and fifty pounds. They are excellent fish on the table.

Sooty terns very numerous; boobies, blue-faced and red-footed, also plentiful. Counted eleven Frigate-birds, all soaring landward while the big fish was being hauled in. They appeared very much like a squadron of monoplanes, so steady and even was their flight or soaring. Black-throated, white-bellied shearwater present but not very numerous. The Gygis tern and noddies are noticeable by their absence, though along the shore some Gygis have been seen, and a few were around the anchorage. Several Tropic-birds about.

During the afternoon I shot three sooty terns,--numbers 451-2-3; and in the evening three more,--numbers 454-5-6. They passed quite frequently across the bow, and even more often astern. The men returning from the Island had a five gallon can full of tern eggs. The forty men working here have lived since July upon sea-birds, eggs, fish and cocoanuts.

February 10

Went ashore, and with the Island sailing craft,--a twenty foot flat-bottom affair with a small bit of canvas,--left for Motu-Upou.

Collection:

No. 1. Pair of white-bellied shearwaters, nesting under low Pena bushes on sand. (Pt. parvirostris). Putu. Numbers 499 plus 498.

No. 2. Pair of black shearwaters (P. cuneatus, chlororhynchus). Upoa, nesting in burrow one foot long, half a foot deep; no shrubs, very low bushes.

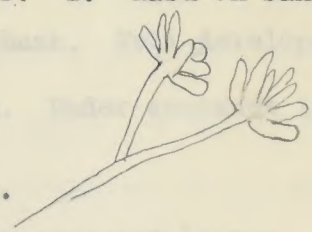
No. 5. White-breasted shearwater, nesting; no egg; beneath low bush.

No. 6. Black shearwater on nest beneath fallen cocoanut leaves; a few dry sticks laid irregularly; one egg. (P. nativitatus). Photographed. Fresh egg B.

No. 7. White-breasted shearwater. Nesting on egg on sand in shade of young cocoanut tree. Photo. L. F. two sec. 16. Sunshine under tree. (No. 500). Hatched at 8:30, Feb. 12, 1921. Lived without food until Feb. 17, 1921.

No. 8. Black shearwater. Nesting on egg, beneath low shrub and fallen cocoanut palms; small twigs collected irregularly. Begun.

No. 9. Tropic-bird (P. rubricaudus). Nesting on egg under low, shrubby bush. Two sec. 16. Incubated ten days. B. Nasu on sand.



No. 10. Young Tropic under same bush as above.

No. 11. White-breasted shearwater, nesting under (Pina) bushes.

Nos. 12, 13, 14, 15. Under fallen cocoanut leaves, white-breasted.

Flying white-breasted keep up a coarse clucking. Approached on the nest, they utter a series of coarse clucks.

Small gray warblers very tame and easily called to within two or three feet. Very hard to see, due to perfect coloration with

shrubbery and bright sand. Where cocoanut trees are plentiful, they keep entirely to small and thick shrubbery. Quite opposite to Marquesas warbler. Have not heard much singing,--merely a light sucking cluck. Nos. 457--471.

No. 16, Beck. White-breasted shearwater, nesting on egg, under cocoanut leaves. B. No. 493. Well incubated. Broken. Q.

No. 17, Beck. Black shearwater, nesting on a few twigs on egg under cocoanut leaves. Fresh. Beck.

No. 18, Beck. Black shearwater nesting on egg under cocoanut leaves. # 473. Fresh. B.

No. 19, Beck. Nativitatis. Fresh. B. Same as above.

No. 20. White-breasted shearwater, nesting on egg, beneath cocoanut leaves. (# 503). Just begun. 20 B. Fresh # 8. Same as above.

No. 21. Tropic-bird, nesting on egg, under Nasu, shrub, sand. Incubation begun.

Frigate-birds are also here, but we are not collecting them. Also Gygis terns and a few noddies.

No. 22. Egg of P. rubricaudus. Under (Nasu) bush. Well developed bird.

No. 23. White-breasted shearwater. Egg. Sand. Under cocoanut leaves. # 505. Started.

No. 24. White-breasted shearwater. Egg. Under cocoanut leaves. # 504. Ready to hatch. Bad.

No. 25. White-breasted shearwater egg. Under cocoanut leaves. # 494. Fresh. B.

No. 26. White-breasted shearwater. Egg under cocoanut leaves. # 495. (P. nativitatus.)

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The call of the Upoa when flying about is a heavy gutteral croak, much resembling a single croak of a bullfrog in tone, but with no gurgling. I looked for the calf that bellowed when first I heard it. When picked up, they utter a groan something resembling a very hoarse person's voice, "Whah-uh!" The noise is made both on inhaling and exhaling. The downy young make much the same noise, only more feeble. Above us while we were collecting, numerous mad and furious birds soared, greatly resenting our intrusion upon their peaceful island home.

The call of the Putu differs widely, being more of a sharp, shrill "clacking" while on the wing. When caught, they have a whine, very shrill and not made by both inhaling and exhaling, but always the same. If the bird were not seen, and conditions such that children or women might be expected, one would first suppose a girl or child was being terribly tortured.

As we were loaded and headed for the boat, along a cross trail where nearly all of us had passed before, we picked up a downy (P. nativitatus) black shearwater. He was situated in a shallow bowl-like hole at the heavy stalk end of a dead cocoanut leaf, with a few small shrubs around the hole. He was very conspicuous after once being seen, but not otherwise or we certainly should have seen him before.

The noise made by the Tropic-bird is beyond me for description.

This morning Mr. Beck and I went ashore in a boat, and there were given the use of a sailing craft,--a twenty foot flat-bottomed

skiff, which made wonderful leeway with its threadbare, line deficient sail,--and a sailor with two boys. At about 7:30 we struck out for an island upon which shearwaters were reported to nest, named Motu-Upou. Our first tack took us out almost to the entrance to the lagoon, and the back tack landed us a few hundred yards away from the warehouse, or point of beginning. Here the two boys got out, and, reaching up the shore, pulled the boat along until we were well around the point. Here we took to the sail again and and made our course direct to the island desired, a good strong current offsetting the leeway.

We landed about 8:30, and the first thing we stumbled upon were shearwaters nesting about under shrubs, where one species, Puffinus nativitatis, was found under low bushes or dead cocoanut leaves, with a flat nest built upon a small scooped basin in the sand with small dry twigs. We also found a pair of Puffinus chlorohynchus in a small burrow, no nest made. These we erroneously mistook for P. nativitatis, and so only found one more, and that by accident (I think one of the native boys brought it in).

Spent considerable time taking photographs of them; also of nesting and young Tropic-birds (Phaethon rubricaudus), which were found here sufficiently for our needs. We gathered some twenty odd eggs, and four downy young, including one tern. Frigate-birds, white terns and a few noddies were flying about above the cocoanut trees on this island. The most striking thing we have yet found is the species of warbler here, Conopoderas aequinoctialis, a very small gray bird which I have not yet heard

singing anything like the Tahitian and Marquesan species. In Hivaoa, Marquesas, they were very plentiful, but remained so hidden in the cocoanut trees and pandanus that it was very difficult to see them while singing. Here I saw but one or two light upon a cocoanut tree, while they remained for the most part hidden in the low shrubbery. They were very difficult to call and wary at Hivaoa; here they are quite tame and approach within three feet of one when called.

We lunched upon cocoanuts, and at two o'clock started back for the ship. They sailed us clear out to the ship, and we started to work upon birds at three, getting no less than twenty finished by nine o'clock. This was with the help of the Captain and engineer, who skinned and scraped the fat off six shearwaters, Mr. Beck making them up. For tomorrow we have plenty of shearwaters and Tropic-birds. Did all the warblers tonight.

We specialized on the white-breasted shearwater which seemed to be the most abundant here, and collected a good series, several with eggs (Pterodromas parvirostris). The terns apparently have finished nesting here, only one downy being found; (Gygis alba candida) according to our notes, though it differs from Gygis alba pacifica found at Tahiti, more nearly resembling the smaller Gygis of the Marquesas, G. microrhyncha.

February 11

I was very much afraid that my writing would suffer terribly while we were here where every minute of daylight must be put in upon the birds, but if I continue to awake at four A. M.

all will go well. The nights here are very comfortably cool with the NE trade blowing quite fresh.

The sooty terns, here quite numerous (Sterna) pass the ship very often, uttering what Mr. Beck calls their characteristic call. It very closely resembles the aggravated "meow" of a kitten in the hands of a bad boy who delights to twist cat tails. "Whau'oo" with almost "r" and "n" tones between the "u" and "o" noted by apostrophe. This tern is called "Kavika", a Poumotu name which the Tahitians apparently have adopted.

This morning we discovered a slight conflict in the booby native names, "Wau" being applied to the blue-faced, and "Kina" to the common booby.

We saw plovers, curlews and wandering tatlers--no doubt North American migrants, but being hunted here they are very wary.

For breakfast yesterday we had scrambled and boiled tern eggs, both of which were very good eating; and, as the birds no doubt lay more eggs, little harm is done to the species. I should imagine the survival of the fittest works well here in selecting those birds which lay best. On an island inhabited, for instance, by natives these past five hundred years, certainly those birds which proved to be the best layers would survive and continue a laying breed.

We noticed out on the little lagoon island, where we were yesterday, very small bronze lizards and a mouse. How did they get there if that island grew up out of the lagoon? Blow-flies are terribly thick and bothersome around here, the ship being well stocked with them an hour or two after the anchor was dropped. They fill the mouths of our birds with eggs before we can get them skinned. In hot

weather the eggs hatch out rapidly.

The dry land of Christmas Island is pure coral sand, with very little else. Motu-Upou is about half a mile long, and less wide. At high tide this morning we sailed to within a few hundred yards of it, but when we finished at two P. M. we had to walk more than half a mile out to the boat across a bed of wet coral muck. Here was an opportunity to see geology in the making. The fine silt of the pulverized coral and shells fill^ed all the crevices with a fine-grained future limestone, while here and there was a shell being embedded for a future fossil, or a solid block of coral to make beautiful beyond description some slab of marble a million years hence. The life of this intertidal zone may be more numerous than is at first apparent. There are a few burrows of one kind or another nearer the shore, and tide pools with considerable fauna nearer the water. At the edge of the water we found an eel coiled beneath a loose block of coral. He was colored white, pink and gray--a very striking resemblance to his surroundings. On this islet were planted cocoanut trees, young though bearing well; we indulged in several drinks. There was also a low shrub, called "Nasu" by the natives, with oblanceolate leaves in a cluster at the end of the heavy stalk; the shrub, itself, was very stalky. There were two or three other low shrubs of a grayish color, with small white flowers in clusters, with tubular corolla.

After skinning out a couple of birds the Captain went ashore, but Titi stuck to his job all morning and got five skinned and scraped. I wrote out all labels and skinned out one shearwater,

besides making up a downy Tropic-bird. Mr. Beck is making up the birds and skinning a few in between times. Today for breakfast we tried shearwaters; this noon we had more, with a young Tropic.

February 11

Spent this day making up specimens.

February 12

Went ashore and walked out to lagoon behind settlement. Killed four warblers (Conopoderas aequinoitialis) by coaxing them out of brush patches. Nos. 522, 523, 524, 525.

The manager was out hunting curlews, and when he saw us he went after his Ford to take us to where they could be found. I went to inform Mr. Beck, whom I found shooting yellow-billed terns from the cover of bushes. I shot three and a Frigate-bird that was bothering the wounded ones. Mr. Beck left them for me to gather up and bring aboard to skin out this afternoon. The Captain and engineer made up four each; ten altogether Tarapapa (T.). Spent the afternoon skinning birds (Thalasseus bergii rectirostris).

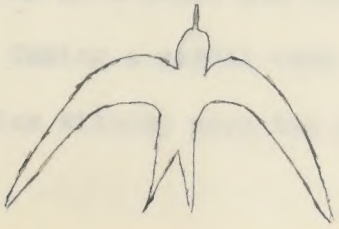
February 13

We were invited ashore today for breakfast with the manager and his wife. The Captain and Mr. Beck, all bedecked in white, accepted, but I could not permit myself to spend even a few hours being sociable when the opportunity of a day all to myself appeared. So I came ashore with them but togged up for the field, with the nesting grounds of the sooty tern as my objective. Fortunately, I

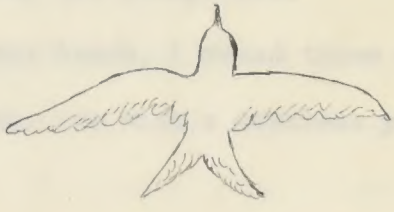
did not have to walk out here because the Ford was in good running order. It brought us, Mr. Beck and the Captain too, out to the tern colony in short order, the lime-stone (coral) sand making a good road bed.

We stopped briefly where some red-footed boobies were nesting on their handful of twigs in low trees; but the black cloud of terns beyond distracted one's attention from them too much. After walking a very few yards, we reached the terns and they rose from the ground amongst the stalky shrubbery in masses not quite solid. At times they are so thick that they hardly have three feet of air space. All flying towards the wind, they present a beautiful picture. Their call when heard in such a volume is much of the nature of an immense flock of blackbirds singing in the background, with a hundred kittens having their tails twisted at irregular moments. On the ground, the eggs sit upon the sand, not so very close together, but not a yard apart, while downy chicks run for the nearest low brush.

There are two groups of birds besides those on the ground, one hovering low down just above the bushes to about twenty-five or thirty feet; then there is another group higher overhead, soaring playfully against the wind with that mystic power of apparently motionless wings. Amongst this group are a few Frigates, masters in the art of soaring. The soaring sooty terns narrow their wings and point them well backwards.



Soaring



Hovering

The downy young seem to range from newly hatched up to wing feathers, but none have been found any-where near old enough to fly. I am convinced, after an hour in this colony, that the old birds are thoroughly able to distinguish the particular call of their young. There have been several demonstrations of this where old birds have hovered above squawking downy chicks, and have answered every call; one bird lit and walked off into the brush with her chick. To get so acquainted would require a day or two with the young one after hatching. To keep the main group close for observation a handkerchief on a bush, waving in the breeze, is a good thing. They will hover about, scolding for hours. They have a sort of cawing noise, much resembling the warning note of the myna; also a sort of quacking cluck used above me.

There is a sort of "rotten egg" smell about the place, the excessive heat of this tropical sun on the sand being enough to spoil any egg. They probably set upon them to keep them cool. I wonder they do not keep more under the bushes with their nests. There is very little dung about for so many birds.

This colony covers an area of perhaps at least two hundred acres. Here is the first instance of two eggs found together. They are being incubated too, as is evidenced by the fresh tracks around them. Here nearly every bush has a little downy tern hiding beneath it. There is also a coarse grass with a clump of shoots, which affords good shade and cover for the youngsters.

Taking a stroll over to the beach, I found three blue-faced boobies sitting upon the ground, one with a downless young

which I photographed with a small premo. When approached, she made a coarse croak, but did not put up any defense for her young one. There are a few red-faced boobies in the low trees here. Farther down the beach, on the land just above it, were two blue-faced boobies apparently deciding upon a nesting place. There are more scattered along here, so I'll spend a few hours with them. The next one was merely resting upon the sand without the slightest sign of a nest, but she flies above me as if she had squatted on this homestead. Next saw another pair, one of which failed to rise, and, upon being chased, gave up two fish, one a flying fish with spotted "wing fins" fully twelve inches long; the other was but the caudad portion of some other kind, but apparently as large a fish as the other.

The next pair was in the shade of a low tree (Nasu), one with its head tucked under its wing in true goose fashion. Then one or two eggs # 27, # 28, which I photographed with a pair in the rear and some terns.

Well, breakfast (hard tack and jam) is finished, and when did man enjoy a more sociable meal? Here in front of me, within twenty-five feet, are more than fifty terns nesting, while overhead hover hundreds of them, all talking at the height of their voices,--a true dinner table chatter. They settled down upon their eggs, and some for no apparent reason to within eight feet of me, but they are afraid to come closer.

Some of them are very "catty" neighbors and keep fighting with their neighbors. There is one now who thinks her little ball of gray fuzz is just the only tern in the world, sure to become

President of the United States, at least if Woman Suffrage gets everything. She is bound to have all the fruit that hangs over the fence around her lot. More than that, she is going to reach a little beyond the fence. Now she is after the neighbor opposite. The distance between the eggs apparently is in proportion to the temperament of the homesteaders. Some are within eighteen inches of one another, while others, like the aforementioned, have everything within a radius of three feet. Here are two Frigate-birds plying their unlawful trade upon these nesting birds. I should think--and they did--that they would tackle boobies; but they also bother the terns a lot, with that long hooked beak, with which they can reach their victim while hovering above him.

Of the tern eggs much might be written, there being, as with all things else, many varieties, good and bad. They are about the size of a small pullet egg, mostly oblong but some quite short. They are speckled or splotched with brown on a dull finger nail background. The spotting is very irregular and varies with the same birds, as the two I found under one bird suggest. It was a striking fact that the birds nearest the beach were setting almost entirely upon eggs, while as I returned to the cocoanuts the young birds increased in number and size.

Near the cocoanut trees I obtained one of the commonest age there, with regular feathers well advanced. What a storm of indignation followed my foot path, and what a cloud of birds formed my wake! It sounded almost as noisy as a baseball park after a doubtful team makes a winning run in the last inning. I found the

birds very willing to fight their feeble bit, but preferring to get safely in the air and then utter a protest.

These low cocoanut trees are very suitable to white men. I could hardly have climbed a tall one with a tender knee. Four of them quenched my thirst. The nuts here, however, are smaller than at Tahiti. Not nearly all of them are gathered; well, it would take a few more than forty men to work an island forty miles long. They are heavily infested with scale insects.

After a thorough consideration of the extent of land covered, I think two hundred acres is still too conservative an estimate, for the birds stretch at least a mile along the shore, and their depth inland is half a mile. The birds in places were even more closely together than where I ate.

At what I thought was four o'clock I caught a dozen birds and loitered about for half an hour or so awaiting the Ford. At five o'clock I gave up waiting and struck out along the trail. When just beyond where we saw the red-footed boobies, I heard a yell. Returning to the open I yelled and yodeled, but the wind was against me. Perhaps I should have returned, and I would have done so had I heard any further yelling or seen the car. But being tired I didn't care to double back that distance in case I was mistaken, so struck down the road we came out. Beyond the camp, and about two kilometers out from the wharf, Mr. Beck and the chaufffeur came along and picked me up.

There are a few things I have thought of since leaving the birds. One is that in sitting upon their eggs they always face

windward, which is only natural, due to their feathering. Another thing that strikes me, is that in all the vast flock flying above the rookery, not once did I see that tumbling by which this bird's flight at sea is characterized. There were many young dead about the rookery for no apparent reason, unless the birds in their haphazard scurrying to get away from intruders like myself, kill them. During the whole day spent here I saw no signs of old birds feeding young or carrying food. As this place is visited quite frequently by the egg gatherers that may account for the deaths. Then, too, crabs might occasionally get hold of an unprotected youngster. Or the birds may leave it or lose it before they learn to recognize its voice, and once lost, there would be little chance of its ever being refound. Even old birds I found occasionally caught their heads in the forks of the shrubs, and so perished from strangulation. But these are all points to be worked out with further and more concentrated investigation.

There are doubtlessly other colonies around the island even as big as this one. Mr. Beck noted one at the Parie end, or the spit south and west of the lagoon; while on the map he sketched for us, Father Ronget,sole lessee of the island, has a very extensive colony noted on the long tongue of land extending southeastward, which we saw February eighth in the evening, and, I believe, again yesterday morning from the other side. This last colony the Father has mapped as extending some ten miles in length. Well, there is the one consolation that we will visit this island at greater length and at a different season, and probably will see a little more of it than these nine days permitted.

Of the other terns, the fairy, (Gygis alba candida) is

of second importance in numbers. We found them at all three of the islets visited in fairly thick numbers, where their deserted nests (supposedly) were quite thick in the Nasu trees. One tree often had dozens of them,--mere handfuls of twigs and dead leaves. In these trees were found the well-feathered young birds collected, which leads to the supposition that the nests belonged to the Gygis in preference to the lesser noddies. One young bird that I found on Cook Island was crouched as closely as he possibly could get in the fork of one of these trees. Most of the others were merely perched upon branches, with no attempt at concealment. The young birds have a splotching of color, generally brownish or blackish over the white feathers, besides the clinging down. They are very active little fellows with their feet which are far better adapted to clinging to tree branches than the other terns. One of the living ones we have aboard was able to climb out of a kerosene case, which proves that his claws are fairly sharp, well curved and controllably strong. It was interesting to see him use his wings widely spread and held against the box, as if his Jurrassie ancestor, Archae opteryx, had not taken the three claws from the wing into his rocky grave and left but flight appendages for his descendants. To what extent might not evolution have developed those three claws! Man might well spare the third and little finger for organs of flight, and birds might as well have had the use of thumb and index finger.

Everywhere this correctly named fairy tern persists in hovering, spirit-like, above trees in which usually a few of them or young ones are perched. So steady is this hovering that an ex-

perienced wing-shot like Mr. Beck is able to line up two of them as their flight crosses. He dropped several pairs that way. I tried it once, missed them both, got bawled out, and since have hunted for perched line-ups.

When our boat landed at the islets, these white terns immediately came hovering above us, uttering protests to our invasion of their contented homes. The sailor boys tried in vain to hit them with coral rocks. But later, when I shot at noddies, they came so close overhead that even I, who could never throw a baseball within reach of an expert catcher, managed to drop three of them with coral rocks the size of my fist. Lest I be judged a good thrower, I might state that two of the three were not the bird aimed at, but others which got in the stones' way. This shows how closely together they hover above one. Their black-rimmed, dark eyes have an appealing expression of innocence which is almost enough to melt the stoniest heart of a confirmed bird hunter. Certainly there is little sport and no pleasure in killing them, while they are a very attractive ornament to all seacoasts.

The specimens we obtained showed a marked variation in size and color of bill, and in the color of the shafts of the tail feathers. They seem to do most of their fishing along shore, but we saw a few out from land a day or so, although not so many as we saw well away from the Marquesas Islands and Makatea. However, of the terns, they are second to the sooty as a sea-going fisherman.

They are very easily attracted by a sucking squeaky noise, and, while hovering above one, will continually make a squeaky whimper. They are often observed carrying small fish in their bill

to feed to young. On the main portion of Christmas Island that we visited they were noticeably absent.

The small gray tern (Procelsterna cerulea), a beautiful, dainty,little,bluish gray creature, was also found on all the islands except Motu-Upou, but as we were entirely absorbed with shearwaters there, we might have passed some without seeing them. At the little islet opposite the cocoanut grove at the 27 km. port from Parie, to which we waded, they were the first bird to greet me. A pair hovered so near that I could not shoot them with dust shot. They utter a very plaintive little squeaky, whiney note, and keep uttering it at rather regular intervals, but not close together. They frequently light upon the coral sand where, if it be dark colored, they are quite indiscernable while perfectly still. The bright beach sand, however, gives them away readily. They nest in small scooped basins beneath the low gray brush resembling western American desert sage in tone and color, where again their coloration is perfect.

The young depend upon remaining motionless for concealment, and seldom move until almost stepped upon, when they break into a rather swift run. If not pursued they run but a few meters, when they again attempt to conceal themselves beneath the brush. These we found in about the same stage as the fairy. Very few eggs were seen, and the few young collected were well feathered; but this might have been due to the hurriedness of our trips ashore, and the younger birds, by not running at all, avoided discovery. At Cook Island, where we spent but a few brief hours gathering in old birds (terns mostly), these little gray ones were quite plentiful. We had noticed in their flight past the ship that they seemed to head

in that direction. They were not observed very far from land.

The common Noddies (Anous stolidus pileatus) we found in flocks of a dozen or more at various places about the three islets visited, Cook Island being best stocked with them, where they lighted among the dark coral rock beds and were rather inconspicuous. They might have had eggs among these boulders, but I failed to find any. At Motu Tabu they were found to alight in quite sizable groups at the edge of the tide water. Several were found perching in Nasu trees, along with the Lesser Noddy. The two nests collected were on the naked sand beneath low bushes. At our arrival on the islands, they joined in the disturbed multitudes in the air protesting against our inroads upon their birdland settlements. Whenever a shot was fired within hearing, they took to wing and were rather wary of approach from the start.

The Lesser Noddy (Megalopterus melanogenys) were found in sizable flocks, and perched upon tree tops in such close mass formation that eight fell at a shot, and seldom less than three were obtained. But they, too, were rather wary of approach, so our photographs were not entirely satisfactory in their respect. Both the noddies are close shore fishing here, not being noticed at sea to any extent or distance. They do wander about the lagoon a bit, but were only observed singly.

February 14

With the Island Ford around to the further side of the island. Golden Plover, Wandering Tatler, and Bristle-thighed Curlew frequently raised before the machine. Mr. Beck shot three of the

latter. Red-footed boobies were nesting in the low Nasu trees along the road. Frigate-birds perched on low bushes, two or four feet high, mostly in pairs, the males with their toy-balloon pouches fully extended. One flew up before the automobile and Mr. Beck knocked it down with his shotgun, but did not injure it. He shot a small one which may be the short-billed species, or variety. It was a thrilling sight to see hundreds of them soaring with all the steadiness and precision of a great squadron of aeroplanes, some with their pouches still expanded flapping in the breeze, a glorious red ornament.

We are stopped now photographing a male on a nest, with the Ford in the background. There were two others on the bush but they got scared and flew away when Mr. Beck tried to put the long focus on them. This part of the island is a success.

(16) Egg 40. Frigate. Three feet above ground, crab holes below small Nasu bush, bird on nest. # ♂ Nest a few sticks. Egg fresh. B.

Egg 41. Blue-faced booby. On sand in road.

We stopped for lunch at 27 km. near cocoanuts. I waded out to small island and obtained eight small gray terns. Here the Pt. parvirostris were nesting closely together on the narrow ridge of dry land, some in small short burrows, others on sand beneath low bushes and grass. Many downy young present.

X and X Nos. from a low bush, spreading 18 shells and sand beneath it leeward of ridge.

(27) Egg 43. Noddy, nest beside clump of grass on coral sand islet. Near 27 km. port. (# 565). Fresh.

Mr. Beck is bringing the camera which I was going to suggest when I got back, for here is an excellent opportunity to picture downy

shearwaters and nesting birds.

(41) Egg 44. Shearwater, white-breasted, # 577 ♀.

We collected half a dozen birds and four downy young.

We have stopped along the route to photograph two blue-faced boobies, one on an egg, the other parading around in indignation--he just took to the air. Well, the other looks mad enough, but hates to leave her egg. There is usually a circular patch surrounding the nest where wing tips and tail scrape the sand, probably as the bird fights away crabs and rats. Egg broke.

Returning, we stopped where the Frigate-birds were plentiful and collected a few. Seeing short-billed ones, we became aware of the fact that they were all males or young, no short-billed females being found. Mr. Beck was able to sneak upon most of them and club them with the gun. We gathered some blue-faced boobies also, and shot one or two brown-headed or common boobies.

Out on the islet I shot a turnstone and we saw one other. Curlews were more wild this afternoon, and as we were driving home like a good old nag, we were going more recklessly and faster and so missed all of them. Plover are more numerous than tatlers here, flocks of five being not uncommon. Saw and obtained one or two gray-back terns (Onychoprion lunatus). They resemble very closely the sooty except for the gray back.

As we neared the sooty tern colony that marvelous sight of thousands of birds in close mass formation was again revealed to us. My estimation increases with leaps and bounds every time I see them. They extended for three or four miles at least this evening along the coast, and were in places half a mile across. Only an accurate survey would

be a reliable basis for estimating their number. There were thousands, at least.

From the 23 to 15 km. port. Red-legged boobies and Frigate-birds soared by the hundreds above us. But we went through them so rapidly that all one can do is quote John Muir, "Nothing is well done at forty miles a day".

Returning to the islet and the little gray tern (Procelsterna cerulea), it was very interesting the way they hovered about me just to leeward and so close that I could not use the auxiliary cartridges on them,--beautiful little slaty-gray, fairy-like terns, smaller than the small Gygis. They would frequently alight so near that I was obliged to back away to use the dust-shot.

There are some interesting life habits to be studied about most of these birds, a phase of Natural History most important and most neglected.

February 15

Spent the day aboard ship skinning birds.

February 16

Went ashore to take motor-boat to Motu Tabu, where we expect to find various terns and another shearwater. But we took the sailing skiff instead. Had the boys tow it to the point where we arrived after half an hour of tacking last week. They started astarboard but we advised the port tack which proved so successful last trip. Their obedience got us into a labyrinth of coral reefs, some of which we just

scraped over and once or twice we struck them. If one is going to sail, he should let the Captain run the ship. Even though he may be but a native Polynesian, he probably knows the lagoon better than the best of ocean sailors, let alone bird hunters.

The small gray tern, white Gygis, yellow-billed, sooty and gray-back, and a noddy have all paid us their respects this morning.

We are now on that wide flat adjoining Motu Upou, across which we walked to reach our boat last Thursday. The sailors are wading and pulling our craft. There is a bad coral bottom and one of the men is a bit tender-footed. The youngest is astern, and I suspect him of leaning more than his weight on the boat. But as long as he doesn't drag his feet it is all right. Progress is more rapid than sailing. The tender-foot--if he be such, what are we?--just rode the boat while he extracted a bit of coral from his heel. Well, we are sailing once more, which, though slower, is much more pleasant to all concerned.

Across the lagoon north'ard, the tops of the highest trees, which are few, can be seen. Sooty terns, the predominant bird inhabitants of this island, drift by occasionally, apparently homeward bound to that dense settlement along the mainland coast.

We have tacked our way out of the reefs and have clear sailing now, but, our destination being to windward, this heel-less skiff is going to take most of the morning getting out there.

10:10. As we near the island, Shearwaters, Tropic-birds and terns are evident.

Egg 45. P. nativitatis, nest a few bits of grass and twigs in small scooped out basin below cocoanut leaves.

(28.) Egg 46. P. nativitatis, under grass and dead tree branches.

Bird # 610. Inc. three days. Q.

Found the young of the long-legged petrel under a small bush. Later on, while searching for them under cocoanut leaves, I heard a faint squeak underfoot. Bird on nest under grass and dead leaves; egg destroyed accidently. The nest was well covered with grass, and was but a slight hollow scooped out of the sand and lined a little with grass. Below bushes.

The next we found was not beneath anything except a very low growing shrub. It was surrounded and covered with grass. A hollow scooped out of sand, apparently in an old hole or basin of a shearwater. Mr. Beck is photographing the bird on the nest. Lined with grass and sticks.

The three shearwaters, already collected, are plentiful here. We collected Pt. chlororhynchus.

(33) Egg 47. Petrel photographed above. (Wrapping cotton). 606. Fresh B.

Egg 48. P. nativitatis under grass in a few twigs and grass, shallow scooped basin.

(34) Egg 49. Petrel, beneath grass, shallow scooped basin lined with grass and sticks thinly. Inc. 5 days. B. Bird # 602. (Blue paper).

(32) Egg 50. Petrel, same as above. Bird # 599. Fresh. B.

(22) Egg 51. P. nativitatis, under cocoanut leaf, scooped out hole eight inches deep, nest lined with small sticks. # 611. Fresh.Q.

(29) Egg 52. P. parvirostris, beneath low shrub on sand scooped out. Fresh. Q.

(21) Egg 53. P. parvirostris, beneath clump of grass, on sand

scooped out. Fresh. Q.

(30) Egg 56. B. chlorohyneus, short shallow burrow in sand, no lining. Fresh. B.

Egg 55. Tropic-bird. (37) Under Tohonu tree with rough bark. Well developed inc. bird. Q.

Egg 56. Tropic-bird. (19) Two feathers. Under Tohonu tree. Few leaves gathered, no nest hollow. Fresh.

(20) Egg 57. Tropic-bird (yellow tag). On ground, Tohonu tree. Fresh.

Egg 58. Large noddy. Egg on sand, a few leaves.

(35) Egg 59 and 60. Small gray tern. On ground, nest on bare sand under bush. Fresh. B.

(38) Egg 61. Tropic-bird, same conditions as 55, 56 and 57 above. Well inc. Q.

Egg 62. P. parvirostris. Under cocoanut leaf. Rotten.

(26) Egg 63, 64. Noddy tern. On sand beneath Tohonu tree. Fresh.

(23) Egg 65. P. parvirostris. Iron bush on beach. Fresh. B.

Finished the day by shooting noddy, small gray and Gygis white terns. Mr. Beck shot nine noddies at once; then I dropped three small gray from a line-up on the beach. The noddies were bunched in a tree. Then we separated and I went to the further end of the beach and crept up a deep line-up of noddies, and after crawling on my hands and one good knee several yards, I was just rising to shoot, when--Bang! (Mr. Beck fired at the other end of the island) and my birds raised. Shot several pairs of gray terns and wrapped up most of Mr. Beck's white terns. We gathered in several young gray, and also gygis terns; also

four Tropic-birds with eggs. Set sail for ship at three o'clock. Several sooty terns passed us, heading for their homesites.

On this one little island we found all three shearwaters plentiful, and from the fresh egg to almost feathered young. The petrel we found in the same stages, and obtained six old birds besides the downy young and eggs. This is the bird we came after, and our results were quite satisfactory. Mr. Beck found one odd plumage of Pt. parvirostris and it was the only one we collected, besides down and feather young. Pt. chlororhynchus we gathered quite profusely and a few P. nativitatus. Of terns there were four kinds present in numbers, both noddies (Anous stolidus and Megalopterus melanogenys), the small gray (Procelsterna cerulea), and the white (Gygis alba candida); also saw the yellow-billed (Thalasseus pergii rectirostris).

The red-tailed Tropic-birds were also in stages from fresh eggs and bad, to well feathered young. The birds have a beautiful pinkish tint all through their feathers, which, added to their glossy-surfaced feathers, makes them striking indeed.

The manager says that in March he sends his sailors out to Motu Upoa and Motu Tabu to gather young shearwaters, the meat of which they eat, and the fat they render into cooking grease which he claims is par excellence for fish.

February 17

Spent the day aboard ship making up the birds from Motu Tabu. With the help of the engineer, who skinned and scraped fifteen birds, we finished up sixty from that collection, and have ten living downy houng to put up later.

February 18

Came ashore this morning planning to divide forces and go to Cook Island and Motu Upoa, but found both the sail-boat and motor-boat out of kilter, the sailing craft being mastless and having sprung a bad leak in the bow. The motor-boat being merely rudderless, we are going to tackle Cook Island with it, using an oar for steering. If we do not find all the birds desired to complete as nearly as possible, in this short time, our collection, we will also visit Motu Upoa. Our most deficient species now are the brown booby (Sula leucogastra), and the gray-backed tern (Onychoprion lunatus), both of which nest out on the further point of land about Parie.

The sailing craft is going into dry dock now by the aid of a block and tackle and rollers and the power of ten natives. Our departure today is becoming more and more doubtful as the motor refuses to respond. The Captain said if we could not get away at, or before, four o'clock we would not leave till morning. What a pity it is to have to leave an island like this, teeming with interesting bird life, after spending but part of six days ashore! I would like to spend a year or two at such a place, making various investigations and life-habit studies.

The colony of sooty terns alone would occupy several months of one's time, and it would be best to camp right amongst them, or at least in the cocoanuts nearby. Motu Upou and Motu Tabu would each fill up another two months or so. Then there would be the colonies of boobies, Frigate-birds and Tropic-birds left to fill out the year. It would also be interesting to test the distance of flight by having marked birds, such as sooty terns, shearwaters, Tropic-birds, Frigate-

birds and boobies, taken from the nest a hundred miles or more to sea, and turned loose at marked times. How far would they travel? What time would they make? Would they pass such islands as Malden and come home? Which would make a hundred miles in the quickest time? Well, if the rush of collecting ever slacks, I'll certainly be tempted to spend a year or two at that work. A recording phonograph would be very desirable to get the various indefinable noises the different birds make at different times. A moving picture camera would also be of benefit to make life-habit pictures of courting, mating, incubating and feeding, flight and the like.

Then there would also be the very interesting plan of banding old and young birds and later recording their annual habits. How much more reliable would be such a concentrated study at one place as compared to the very discursive pick-up notes of transient collectors!

Eggs 66, 67, 68. Tropic-birds under Nasu trees, Cook Island. We finally took our ship's boat crew and all, and went to Cook Island, where we found the noddies, Gygis, small gray, yellow-billed and sooty terns. The first three we collected. The boys brought in all the young Tropic-birds they could find, also a few old ones. They disgorged--the birds did--mostly squids, but some very sizable fish. Back to ship at about eleven ready to sail.

Set sail from Christmas Island at 3:00 P. M., taking a southeastward course around Parie spit, where Mr. Beck noticed another large colony of sooty terns. We were unable to get to this end of the island. The sooty tern (Onychoprion fuscatus) certainly is the Christmas Island bird. It far out-numbers all the other birds combined.

We worked upon birds steadily until dark, and, strangely enough,

I found myself developing a little speed with the Lesser noddies, succeeding in skinning a bird while Mr. Beck skinned one and make up the two. Came near developing seasickness, but passed safely through the afternoon. Too rough and windy for the lamp tonight, so we did not work after dark. Our ship is loaded to the bulworks and above them with Copra. We carry some hundred and eighty tons, worth as many hundred dollars American. This is certainly the South Sea industry, and a very valuable one it is, too, for the commercial world. From this Copra is extracted cocoanut oil, which has many important uses from hair tonic to bread spread. Amongst the natives it almost replaces money by being the means of exchange.

February 19

Some sacks of Copra were shifted yesterday so that we now have a four foot clear space across the fore portion of the quarter-deck. There I spread my mattress and curled up in the two blankets, which were none too many. During the night I had various irritable callers. First there were the bird lice which climbed aboard while at work upon the birds. Thank goodness, they only live a day or two on human skiffs! Then there were the copra bugs, a beetle .5 to .8 centimeters long, but they were comparatively scarce. Lastly, there were creepy, crawly, slimy worms, many of which I removed during the sleepless night. Daylight revealed them to be blow-fly larvae, commonly called maggots. They were quite numerous alongside the mattress at the edge of the deck, but just where they had come from I cannot yet say. Perhaps they dropped upon my blankets from the bird shelf above my junk bunk. Finding no meat on the birds, they desert them soon after hatching, the

majority even failing to hatch. Well, I survived until daylight, and then took a good ship-bath, which would probably be called a sponge bath ashore, and which has several unprintable appellations in the marine corps parlance. It comprises the art of using less than enough water to wash hands and face upon the entire body. The best method is to soap down with the short allowance of fresh water, not getting that in the basin soapy; then swabbing off with the plentiful briny of the deep; follow that with a rinse of the remaining fresh water.

Sometime during the night our course was changed to NNE on a port tack, and this morning we found ourselves quite close to Christmas Island. Since then, the Captain has kept us steadily SSE and a little bit east of that direct line for Tahiti. The breeze is almost due east and is good and stiff, keeping one well cooled off even here at the equator.

Just after breakfast, our trailing fish hook caught another splendid albacore that weighed at least one hundred pounds. Of it Mr. Beck got some pictures. We are sailing a wavy sea this portion of our trip, and what with rather ripe birds to skin and gasoline, a tendency to become sick was quite prevalent about the cabin. Again I pulled safely through, but was a bit too dizzy to work very well. We managed, however, to finish up enough birds to get us safely over the four hundred mark we set ourselves for this trip. What with our long stay at Marquesas and the good help of the sailors, we were able to put up that many birds in about eighteen days of actual work. Besides that, we have a dozen or two eggs and several dozen pictures to show for our two months of time occupied by the journey.

We have a splendid waxing moon, but alas, no song leader

like the middle-aged women we took to Marquesas. An attempt was made tonight, but they wavered from the interesting native songs to translated hymns.

Worked on birds all day except at moments when unseaworthy. Nearly everyone was sick a bit this morning. The ship has a most exhilarating roll in this sea. The few moments we were on deck, boobies, sooty terns and shearwaters were generally present. The sooty terns were heard quite frequently during the night. Just after breakfast the Captain caught an albacore of about one hundred pounds, a splendid table fish.

While at Christmas Island we had thousands of blow-flies and house flies in the dining saloon where we skinned birds. In the field the blow-flies were noticeably prominent, depositing their eggs about the eyes and bill of birds if exposed but a few minutes. Where the temperature is fairly warm and constant, as it is here, eggs deposited in the morning hatch out in the afternoon. So where we collected one day and spent the next skinning, not a few birds had some feathers slipping the second day. But a very few of the house flies are with us today, and most of them will soon blow overboard.

We have rid our quarters fairly well of the ants, but now we have a new visitor, the copra bug, a beetle shiny green and about .8 centimeter in length. The birds here were as characteristically lousy as seabirds elsewhere are. So we were pestered a bit with what few of those vermin that happened to get aboard us while handling the birds. But they either die soon or desert our human ships as being insufficiently feathered to suit their fancy.

We finished up the skinning this evening, reaching the number 714, which is 407 since we left Tahiti. But of that number we have fourteen or fifteen living downy young terns (sooty, gray and white), shearwaters and a petrel which we will take care of next week.

12:00 M. Lat. 1° 38' N. Long. 157° 7' W. Gr.

We tacked back on a NNE and once again sighted Christmas Island, but since noon we have held steadfastly to a SSE course, and have made good distance in the stiff easterly breeze. We have as passengers for the return voyage seven or eight men and two women of the Tahitians who work on the island for Father Ronget. Having finished their contract, they are quite anxious to return to their native land. Also a young Frenchman, formerly assistant manager of the plantation, is returning in answer to a summons for him to serve in the French army.

Two sooty terns fly carelessly by, northward bound. How recklessly they play about during these twilight moments! But the short distance from here to Christmas Island, though a day's journey for us, means but a half hour's easy flight for those swift swallows of the sea.

In looking over our bird notes, I happened to think that the reef heron, so common at Tahiti, Makatea and Marquesas, was not noticed at all at Christmas Island during our brief visit. Of course, we were little along the outer coast, but still they should have been in the lagoon.

A summary of our collection gives the following:

At Tahiti

PHASIANIDAE:

Gallus tahitiensis--Jungle Fowl.----------2.

TRERONIDAE:

Ptilinopus purpuratus--Green dove.----------31.

RALLIDAE:

Porzana tahitiensis--Rail.----------1.

STERNIDAE:

Gygis alba pacifica--White tern.----------10.

Megalopterus melanogenys--Lesser noddy.----------0.

Anous stolidus--Noddy. ----------11.

Procelsterna cerulea (?)--Gray tern ----------3.

Thalasseus bergii rectrirostris--Yellow-billed--------8.

SCOLOPACIDAE:

Heteroscelus incanus--Wandering tatler----------11.

CHARADRIIDAE:

Pluvialis dominicus fulvus--Pacific golden plover----5.

ARDEIDAE:

Demigretta sacra--Reef heron ----------14.

Butorides stagnatilis--Green heron----------12.

PHAETHONTIDAE:

Phaethon lepturus--Yellow-billed tropic-bird---------2.

SULIDAE:

Sula piscator--Red-footed booby----------11.

ALCEDINIDAE:

Todiramphus sp.--Kingfisher----------41.

HIRUNDINIDAE:

Hypurolepis tahitica--Swallow ----------17.

MUSCICAPIDAE:

Pomarea nigra--Flycatcher ---------- 1.

SYLVIIDAE:

Conopoderas caffra--Warbler ---------- 21.

PLOCEIDAE: (Intrd.)

Lonchura castaneothorax--Yellow Weaver-bird--------- 32.

Aegintha temporalis--Red-rumped Weaver-bird--------- 27.

? --Red-bellied Weaver-bird---------27.

STURNIDAE: (Intrd.)

Acridotheres tristis--Myna----------19.

At Marquesas

TRERONIDAE:

Ptilinopus sp.--White-cap dove---------- 33.

P. sp.--Red-cap dove ---------- 3.

STERNIDAE:

Gygis alba pacifica ----------12.

SCOLOPACIDAE:

Heteroscelus incanus--Wandering tatler---------- 2.

ARDEIDAE:

Demigretta sacra sacra--Reef heron---------- 1.

SULIDAE:

Sula leucogastra plotus--Common booby---------- 2.

MICROPODIDAE:

Collocalia ocista--Swift----------17.

ALCEDINIDAE:

Halcyon godeffroyi--Blue kingfisher---------- 6.

MUSCICAPIDAE:

Pomarea nigra--Black flycatcher---------- 39.

SYLVIIDAE:

Conopoderas mendanae--Warbler----------17.

At Christmas Island and enroute thereto from Marquesas.

Puffinidae:

Puffinus nativitatis--Black shearwater---------- 19.

P. chlororhynchus-- " " ---------- 13.

Pterodroma alba (Procellaria parvirostris)--White-breasted shearwater---------- 35.

HYDROBATIDAE:

Fregetta albogularis--White-throated petrel-------- 10.

STERNIDAE:

Onychoprion fuscatus--Sooty tern ---------- 27.

O. lunatus--Gray back or bridled tern---------- 3.

Anous stolidus pileatus--Noddy tern---------- 15.

Megalopterus melanogenys--Lesser noddy---------- 25.

Procelsterna cerulea--small gray tern---------- 18.

Gygis alba candida--White tern---------- 20.

Thalasseus bergii rectirostris--Yellow-billed tern--11.

SCOLOPACIDAE:

Phaeopus tahitiensus--Bristle-thighed curlew--------- 5.

Heteroscelus incanus--Wandering tatler---------- 1.

? Arenaria interpres ? --Turnstone---------- 1.

CHARADRIIDAE:

Pluvialis dominicus fulvus--Pac. Golden plover-------- 1.

PHAETHONTIDAE:

Phaethon rubricaudus--Red-tailed Tropic-bird----------18.

SULIDAE:

Sula dactylatra--Blue-faced booby ---------- 7.

S. piscator--Red-footed booby ---------- 9.

S. leucogastra plotus--Pacific common booby -------- 1.

FREGATIDAE:

Fregata "aquila"--Frigate bird (Otaha) ---------- 4.

SYLVIIDAE:

Conopoderas aequinoctialis (Otiotio)--Warbler-------21.

This raises our number of species or forms to at least forty-one.

February 20

Saw but few birds this morning--boobies, shearwaters, and sooty terns.

12:00 M. Lat. 0° 33' S. Long. 159° 08' W. Paris. Spent most of the day below deck looking over notes. Course S E x S., part of time SE.

Last night I shook my blankets well and hung them to the boom of the main sail for an hour or two. But again the fly larvae (which sounds less obnoxious than maggots) bothered me some, and were quite thick this morning along the deck. I am quite at a loss to say whence they came.

February 21

Squally during the night. At 12:30 a sudden gust of wind came up and the helmsman failing to compensate the ship, two weak spots in the rigging gave way. The shackle supporting the main sail broke, letting that heavy sheet fall with a crash; and up forward the jib boom snapped off at a rotten place where two bolts passed through it. So this morning we are sailing without jib or main sail; the latter is fixable, but the former cannot be remedied until Papeete is reached. As it is, we are making about three miles an hour, or perhaps a little more. Showers frequent this morning.

11:15. The main sail was fixed and put in commission, which helped us along a little better. The first mate climbed to the mast-head, and, securing himself there, fastened a device to the mast with a quantity of rope. This while the ship was rolling so much that low, broad chairs tipped over down in the cabin. What marvelous semi-cir-

cular canals he must possess to keep a clear and level head under such conditions eighty feet high!

12:00 M. Lat. 2° 19' S. Long. 159° 17 P.

This morning we killed the three partially feathered young shearwaters brought alive from Motu Tabu five days ago. Two of them died respectably enough, but one, after all this period of fasting, disgorged a large quantity of oil. Young Pterodroma parvirostris of this age when molested utter a series of successive "Kah-kah-kah-kah-kah!" notes about a dozen at a time in a very sharp and startling tone. Similar to the call of the old birds on the nest.

Puffinus nativitatis, the mythical death-scream bird of the native Tahitians, "Upoa", gives a call of a double syllable, "Whah-huh! Whah-huh!" The first syllable is very low and gutteral (nasal in man) and well drawn out, while the latter is of higher pitch, short, and sharply cut off. Old birds flying about extend the first syllable into a long uncanny call.

The native tradition concerning this bird is that when the death scream is heard someone very near and dear to some of those within hearing of the uncanny call, (and it is enough to make a superstitious person shudder with fear), is at that moment dying. The week before we left Papeete, I was closely implicated in an illustrative incident of this kind. A very intelligent American college graduate, a man who has made a very thorough study of the Tahitian natives, and one who is an authority on their language and customs, went out into the country for a Sunday dinner with some friends at the native village of Papeari.

Monday morning, as I was about to take to the field, I stepped into the cabin of Captain Norris who had introduced me to the above mentioned man, and who had long been a very intimate friend of his. The Captain was dead in his reading chair; the electric light was still burning; a magazine held in his death grip lay in his lap; his pipe had fallen from his open mouth across his shoulder spitting tobacco ashes, his head having dropped backwards. Sometime before his usual bed hour of ten o'clock the Captain had died.

After the funeral, the Captain's friend and mine related to me how that Sunday evening the party he was with was startled by the death-call (it should not be termed a scream) of Upoa. A young lady at the same time yelled for help. The party rushed to her aid and saved her baby from strangulation. Whereupon the native comrade of my friend remarked, "The Upoa's call was not for the baby; it must have been someone else." That was about nine o'clock, and is the most likely hour that the Captain had died.

Just before we sailed, I told my friend to record any death-calls he heard and I would keep a record of the time our ship sank. When I return, I shall tell him that I expected to find Papeete wiped off the Island of Tahiti and a few score of my friends drowned, because while on Motu Upoa and Motu Tabu I heard several scores of the Tahitian night-bird Upoa's death-calls.

I have tried to fathom the origin of such a tradition, and think the following is the most likely. At Tahiti, the shearwaters (Puffinus nativitatis, Upou,) included no doubt nest (we haven't found them yet but hope to, although that particular species is not recorded from there; P. chlororhynchus is, and Mr. Beck has seen them

near the island). The early morning departure of this bird from the nesting places in the mountains would very likely account for its call being occasionally heard during those hours of man's lowest vitality, i.e. between two and four A. M. when the majority of deaths occur. And especially would anyone sitting beside the death bed of a friend where quietness prevails be likely to hear any passing Upoa. This might be the explanation for such a well established superstition as this is. I heard of the legend from half a dozen sources, and tried in vain to get people to describe the bird that made the call, but no one seemed able to do so. Most Americans and Europeans believed it to be some sort of an owl because heard only at night time. But here at Christmas Island we found the Tahitians definitely naming the black shearwaters, Puffinus nativitatis and P. chlororhynchus, Upou, and the Island of Motu Upou was named because of their abundance upon it. Here is an example of native inefficiency of observation, for they believed the two species were merely "tahne" and "vahine", male and female.

We killed and skinned half of the downy shearwaters and some terns today. Mr. Beck did the skinning. Saw a few sooty terns and a tropic-bird today during the brief intervals on deck.

February 22

A clear day with the breeze dropping in the forenoon, but rising again after the machine was started. Although the ship has been held SE x E part of the time, and generally SE, the strong westerly current has held us somewhat in that direction so that we are passing considerably westward of Malden Island, though we will probably touch close to Starbuck.

12:00 M. Lat. 3° 36' S. Long. 156° 59'. Run,

Today we finished up the little terns and the Tropic-bird, leaving two shearwaters and the petrel to do later. By bringing in these youngsters alive, we were able to do sixteen more birds than we could have managed otherwise. (A small whale just furnished a little excitement by spouting within a couple of hundred meters of our portside. Torau, the sailors call him. He failed to show himself at all, merely blowing a small bit of spray into the air a meter or two, every minute or so.) Sooty terns present occasionally this morning, and shearwaters noticed but not identified by me. I am not yet familiar enough with them to recognize them at a distance, even with good glasses. A Frigate bird was seen to the eastward, no doubt from Malden.

3:00 P. M. A small flock of sooty terns fishing off the port bow, but they dispersed before we reached them. A petrel alongside the ship. If small tubinares are petrels, I am yet at a loss to understand what distinguishes one from a shearwater. Sooty terns more frequent this evening.

February 23

Sooty terns are very numerous this morning, coming from five or six points to starboard, which is perhaps the direction in which lies Starbuck Island. Sailors went up to the masthead last evening and this morning, but could see nothing. A vigilant watch was maintained throughout the night, for Starbuck has a dangerous barrier reef lying a thousand meters off shore. With the overly bright full moon and sharp-eyed sailors there was not much danger, however. A few shearwaters and one or two small petrels and one young red-footed

booby were our only other near visitors.

Passed Starbuck Island to leeward (starboard) a few miles, from eleven to one o'clock. A very low streak of white sand along the horizon, with no signs of vegetation visible through the glasses. Either flying sand or spray from the breakers formed a sort of cloud above it. The breakers were not very evident despite the high sea. A most treacherous place in the night time or in a storm for a ship would be upon the reef before aught of the land or dangerous coral barrier could be seen. How surprising it is that so few wrecks actually do occur!

12:00 M. Lat. 5° 36' S. Long. 157° 50' W. Gr. Run,

Even as we passed nearby the island nothing but Kavika was seen. This should have been named Sooty Tern Island. Who was Starbuck that he should deprive them of their own? Towards evening a flock of a few hundred of these same dauntless terns was observed fishing. Three or four frigates levied tribute from the flock, but other than that, no alien enemy was seen in their midst. Again just before sunset we pass through a small flock of sooty terns. Well, no matter how common they be, they are certainly friends of the sea voyager.

February 24

The sooty tern was with us at times during the night. He was present first thing this morning and has been alongside singly, in small numbers, and comparative flocks all day. In one flock far to starboard we saw three or four frigates and thought we saw a booby. There is something thrilling about the quixotic flight of these sooty terns at sea. With their rapid eccentric beat of wing, in quick

snappy jerks with a pause betwixt them, and that ever amusing darting or tumbling I can sit and watch them with pleasure four hours.

12:00 M. Lat. 7° 07'. Long. 157° 42' W. Gr. Run, 85 miles.

In the early afternoon a flock of terns was observed in which were a few white ones. A petrel and a shearwater were seen just after noon. The sea continues to swell fairly high although the wind is not at all heavy. We made a good run yesterday, and if we do as well the rest of the trip should get into the Society Islands in a week or eight days. The Captain is going to use some gas tomorrow. I hope he does not use it up now, when it might later be sadly needed. He figures he can get more at Raiatea. Well, 'twere best to rely upon what we have. It is poor policy to not save for the last of a journey. All our fruit and jam for instance was served twice a day until it gave out. Coffee is next on the list, then we start upon tea. So far, we have fared very well at table, but it's a poor policy. One of the sailors caught a nice bonito today.

A booby came about the ship after sundown and a few terns with him. The terns went back towards Starbuck, but the booby still lingers off the starboard stern. And he lingered late into the evening as long as we could watch him for darkness. Frequently he appeared desirous of resting aboard but did not alight.

February 25

Upon arising this morning I observed a frigate-bird steadily progressing north northwestward, doubtless bound for Starbuck, a hundred miles or so in that direction. How far, I wonder, can they see land from the vantage points that are theirs?

Also a black shearwater was present off the starboard but I was not able to tell its species.

The engine is being run this morning. We finished blowing the eggs.

Just before noon two white terns observed flying northward. Next to the sooty, they wander farthest from land of the terns hereabouts. Fairy tern, Mr. Beck calls them, and well do they deserve that name with their whiteness and gentleness. Dainty little creatures hovering above tree tops and over one's head like true aerial spirits! A black shearwater is making his wide sweeps into the troughs of waves and out again, and up into the air a ways to get the advantage of gravity for another grand sweep.

12:00 M. Lat. 8° 51' S. Long. 157° W. Gr. Run, 110 miles.

A flock of sooty terns accompanied by a few gygis, fairy terns are fishing. The birds, no doubt, follow the school of small fish upon which they feed. They waver across the field of the glasses; then of a sudden the sooty terns sweep away in a body, later to sweep back or to go on above the fish. When the ship passes near a flock of fishing birds the boys get out the fish lines, and usually with good results. For it seems the big fish, which feed upon the lesser fish and which have us larger fish to bite'em, follow closely the schools upon which the birds feed. This little example of the balance of life is the best argument there is against the divine origin of man, and is rather hard to make conformable to the existence of a supreme all-governing mind. Such a power might have devised a more divine and kindly method of keeping an equilibrium. It looks to me like nothing more than a cold-blooded and heartless struggle for existence, with man lined not very

distantly removed from the most heartless center of the struggle.

It is extremely hot under the blazing noonday sun on deck, and sultry and suffocating with gas below.

A booby was around the schooner in flight several times during the afternoon. Mr. Beck saw a yellow-billed tropic-bird.

Sooty terns present at times during the night, and I believe a tropic-bird that I saw above the mast.

This keeping of two note-books is going to prove disastrous to one or the other, I fear. Still, it is the only way I can see of having a place in which to record my thoughts as I desire. To intermix them with my scientific notes is not doing justice to the Museum, which desires to keep the original note-book on file.

February 26

A flock of birds went westward early this morning, including terns, frigates, and shearwaters. Went over eggs and renumbered them. We have some thirty-five blown and dry and wrapped in cotton, with eight or so set aside to.

Just after breakfast, Mr. Beck shot a petrel off the bow. The sailor with the net missed the bird. Thinking it might be a Bulweria macgilveryii, of which Loomis says, "A second specimen is yet to be taken", we had the Captain turn around and pick it up. I gave the net to Buro, the cook, who has not as yet failed to get his bird, then took up a position on the bowsprit and pointed out the bird to the Captain. Buro got the bird, and we rushed below to trace it down to Bulweria bulweri, a very common and widespread species, but apparently

not recorded from the Pacific below the Equator, where the Museum notes say it "may wander".

12:00 M. Lat. 9° 58'. Long. 156° 24'. Run, 75 miles.

A squall passed on the starboard, and then a flock of fishing birds appeared ahead, sooty terns, boobies, and a frigate. One of the natives gets out a fishing pole and line, both very heavy, with a hook made of cut pearl-oyster shell tied to a heavy barbless copper hook, and trimmed with a tuft of cocoanut fibre. It greatly resembles a small fish skin using the surface of the water.

Suddenly there comes a splash, and the native is straining at his end of the pole while the line cuts the water in every direction as the maddened fish makes a fierce struggle for liberty. Shouts of various sorts, Tahitian, French and American rend the air. Everyone rushes astern. Mr. Beck has dashed below and comes up with a graflex to record the occasion photographically. Now the Captain is helping pull in the victim. All is excitement and energy. Then! A loose line flies into the air. Loose tongues ejaculate indignantly. A fine, big fish still swims in the briny deep.

But there! Another line is out and the hook already taken. Again the excitement! Again a snap! Another fish is free and has taken with him hook and line! Now the Captain has another on the first hook, and this time, with the able assistance of the engineer, the victim is heaved aboard and now lies upon the quarter-deck beating it with his strong, muscled tail in sharp staccato thuds. I pick him up to guess his weight, sixty-five pounds at least. Click! Another picture! The rest is just fishing, for the flock of birds is now far astern, and where the birds are not fishing there is little or

no hope of man succeeding. Tonight the Captain and engineer will "inhale" raw fish and cocoanut sauce.

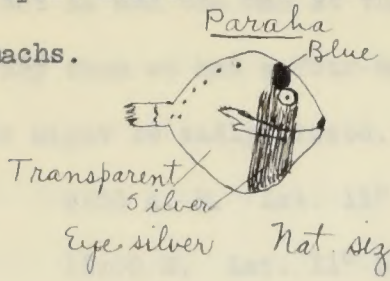
A very dark phase of juvenile plumage in a booby, species not determined, was about the ship briefly this afternoon.

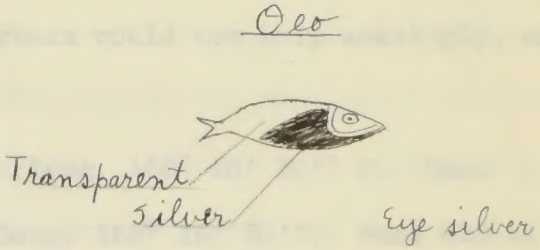
A small petrel which Mr. Beck could not identify, caused the men to warn us, but the bird failed to place before Mr. Beck's sure gun; nor did a black shearwater, probably Chlororhynchus. Whereupon, I brought Shakespeare for'ard, and have taken a post on the bow with gun handy, but never a bird has appeared. They have little to fear from me. A rolling ship and a flying bird are more than enough to meet my yet untrained marksmanship.

Several sooty terns ahead are apparently fishing; they went off eastward when I retired to the dining saloon for dinner.

The lemon-juice pickled fish was not done enough for me, but the cooked albacore was most delicious. During the midst of our dining, there came the shout of fish and a crash upon the boarded skylight overhead. Auhopu. Three lines were cut and the fish biting well were heaved heedlessly inboard. One flies down the gangway and comes up beneath our table, we long since being up where the excitement is; more are flying past us and keep us ducking. Now the Captain has a large one and gives a mighty heave, in proof whereof his trousers bear two large rents fore and aft. The bonito, freed from the barbless hook, flies forward through the air, misses a few clever and active dodgers, and strikes the main mast. Again the Captain has hooked a fish, and with a shot he heaves it inboard. "Dodge!" Too late! The man at the wheel gets the heavy fish squarely astern the port ear, and goes down for the count of one. He didn't shout for

joy at that catch. In all, twelve or more bonitoes are flapping about the deck. That black booby comes up astern. I get the gun, for Mr. Beck is busy with the camera. But the birds swerve off eastward and our sport ceases. Mr. Beck has just brought me two fish from their stomachs.





A little later, three or four more were pulled aboard,-- sooty terns, a few boobies, and two frigate birds attending this second school.

Weather today has been threatening and light sprinkles have passed over us. The sea is rather quiescent, just slight ripples surfacing the great easy swells.

10:00 A. M. 2, 27, 21. Our catch of bonito is now divided into three lots. Fresh fish is sizzling inside the galley, where Buro, our three-toothed but proficient cook, reigns supreme; raw fish is pickling in lemon juice, a good sized dishpan full; and the rest is spread out on clean boards above the galley in this hot sunshine to dry. These natives certainly are fish eaters. One of them today is polishing the pearl-shell hook with bamboo and water, very effective.

February 27

Awaking this morning at the end of the dog-watch, I took the wheel until daylight. Clouds about the horizon, more calm than yesterday. Engine ran all night, but must stop now because we have no more gas to waste.

A booby twice came about the ship this morning and a petrel with white bar on forehead came up astern, but not within reach. The sun became so hot that a canopy was spread above the quarter deck to protect us and the man at the wheel. That gas we used early on the journey when we had a four-naut breeze would now help amazingly, and later might be sadly missed.

8:00 A. M. Lat. 11° 10'. Long. 155° 20' 30'' P. Run,

12:00 M. Lat. 11° 52'. Long. 155° 16' 30''. Run, 125 miles.

Decidedly calm, but not yet glassy. As we are down to our limit of gas, unless a shark comes around we are out of luck for a day or so. The Captain has instructed the sailors to keep a sharp eye open for the shark that holds back the wind. If he can catch the shark which becalms us we'll get wind enough in a favorable direction.

Birds were limited to a few straggling young boobies, two being seen singly and three at one time. One black shearwater was seen. This with us but eighty miles from Flint Island is strange. Two white fairy terns just gave me the lie by flitting quixotically by the ship. Here come the three boobies. Two of them I dropped too far away from the ship to be reached by the net, but one of our passengers jumped ship and swam after the second one in spite of possible sharks and the Captain's shouts against the rash act. They threw him a line and he returned with his bird, a black plumaged, red-foot booby (Sula piscator). Later I missed the third twice and finally but tipped his wing and he landed far to starboard. A white tern flew over us, headed westward. A booby came up astern and swerved off to the east'ard, where lies Flint Island.

February 28

Very light breeze during the night, the ship hardly making two nauts. At four A. M. the boys on watch found the trailing fish line tripped and pulled in a fish. So I got up to help them land him. It proved to be a shark, but slightly smaller than mine. With a strong rope noosed over his head, they hung him to the rail until daylight, when he was dragged forward and aboard. A male, five gill slits, first dorsal fin much larger than second; dorsal portion of tail much longer than ventral. In the stomach were three "eagle-beak-like" shells which are the hard portion of some soft bodied victim. The funny part of it was the way a little more breeze came up following the capture of the shark. Being devoid of sleep--then, but not now,--I relieved the man at the wheel until five-thirty.

Heard some sooty terns and saw one soon after daylight. Boobies and frigate seen far off to starboard. White tern passed us from direction of Flint. A black shearwater, and later three more were observed.

This morning I made up the young booby, using sand, which, heated, worked very well in place of corn meal, and grass for the body, cotton used in eyes and head only. # 720, male Sula piscator.

12.00 M. Lat. 12° 14' S. Long. 152° 29' W. Gr. Run, 55 miles.

Three more runs like that, and then we have enough gas to carry us the remaining two hundred miles in two days.

This afternoon the breeze has swung around to a little north of east, which helps amazingly when there is not much of it. Mr. Beck shot a yellow-billed tropic-bird (Phaethon lepturus) which seems to be much smaller than my bird from Vaihiria. May it prove a smaller variety

and add that much more interest to a most fascinating work!

The weather became so extremely calm that the Captain has started the machine and says he is going to run it as long as the gas lasts unless a wind comes up. Well, we might as well be becalmed later as now, and it is just as well to be within a hundred and fifty miles of Papeete as out here. We stand better chances of help, or at least report in close. That man was right, though, who said these schooner Captains consider their ships steamers until the gas is used up. How many hours was the engine used when we had a good four-mile breeze that now would take us these few miles, and so shorten our journey by days!

Mr. Beck shot a noddy and sooty tern, but the sailor very carelessly let the sooty slip away from the net.

Weather looks threatening tonight. Will clouds and rain bring wind? We run along at about five miles an hour with the engine, so if the gas lasts well we'll make two hundred miles today and tomorrow.

March 1

The rain came about midnight after a very sultry evening. My shelter on the aft companionway scuttle, half below our tent-floor canvas over an oar, and half below the edge of a sail covering the copra, failed me because the sail canvas pooled the water and let it drip in upon my head long after the rain had ceased. I was further out of luck because the mainsail was swung over above me, and I got the flood from it. Another shower came up at three-thirty, so I went below. Following this one, a head wind came up, so that now when our gas runs out (the engine ran well all night) we can at least tack five

points to the wind E.

I skinned the noddy, bird # 722 ♀ young bird; very poor; very lousy; stomach contained two partially digested sardines 80mm. plus in length. Mr. Beck made up the yellow-billed bo's'n.

Slow drizzling rain set in about nine o'clock. Two boobies and a black shearwater observed this morning. Mr. Beck saw a Pt. rostrata (?) and others, so after lunch, when siesta hours stopped the typewriter, I came forward with the gun to pick up any bird that chances to pass nearby, if I can hit them.

12:00 M. Appr. Lat. Long. Run, 110 miles.

Cloudy weather prevented sure observation, but the Captain got a reading and gave us the above point. If the gas will hold out, we will, at this rate, reach Papeete Thursday evening.

Occasional drops of rain; sky clouded over.

Lighter sky. A frigate-bird is soaring about far ahead of us. No other birds seen, though I have searched the seas with the glasses.

Two sooty terns and then a shearwater quite distant, four points off the port bow. A booby crossed astern, headed south'ard. Nothing came near enough for shooting this afternoon.

Just before we sat down to dinner, the engine stopped, and now we hit and roll helplessly, with not the slightest breeze astir.

A tern observed far to westward, where a cloud looked much like the island of Tahiti.

The southern half of the horizon is enclosed in two great banks of rain clouds, while north'ard all looks fair and serene, with but a few silvery clouds to be seen. May the black clouds south and

southwest prove an interesting storm, for we have had nothing but squalls thus far! Still, I'll recall that wish because of the wealth of copra we carry above deck, which would spoil in a heavy shower. The sea is very calm, with just a little ripple and great swells, two or three hundred meters apart.

I little thought, while living in Papeete, that it would ever be as attractive as it is these last few days. First, it harbors an accumulation of mail from friends at college and home and elsewhere in this wide world. Then, there are the friendships made on the island itself, both native and introduced,--one introduces himself to the natives. As for the village of Papeete, I'll welcome some ice cream for one thing, and a bit of candy for another. As for the island, I am only too anxious to eat of its fruit, and again wade its rivers and wallow through its tropical vegetation and ascend its mountain slopes.

March 2

The gas is holding out well, and we are moving along at five knots for Papeete. I spent the morning below decks writing. Mr. Beck killed a gray back tern, Onychiria lunatus, but he fell too far out to reach, and it was necessary to turn around and pick him up. A few shearwaters, white-breasted and all black were noticed.

12 M. Lat. Long. Run, 116 miles. We have but about 140 miles to go, which, if the gas holds out, will mean Tahiti at six tomorrow evening.

I came forward again and watched for birds. One booby crossing as I came up later joined two others, but kept well away from the ship. White terns noticed twice, and one tropic-bird. Two shearwaters at a

distance. Finally a booby came up and placed beautifully, but, having failed to move the safety catch, I let him get too far to leeward and he could not be reached. A stiff breeze from SE, our course since noon being SSE. Stormy in east.

March 3

The engine was stopped at ten o'clock, the wind being quite strong, and since has shoved us along at least four knots an hour. This morning everyone is straining eyesight, looking for Tahiti and Morea, but at best they are sixty miles distant.

A yellow-billed tropic-bird called us to arms, but he did not come low enough. The cook, who seems to be the only one able to net the birds, picks up the net whenever we get out the gun.

Two white gygis terns, two shearwaters and a young booby have already been near the ship this morning.

Mr. Beck has noticed several Pt. rostrata close enough to recognize. This bird, recorded from Tahiti, is very likely the Noha we searched for so much in vain. May we find them plentiful this month!

12:00 M. 7 miles NW of Morea.

Owing to the fact that we must tack off to the NE, we will not get over to Tahiti until about six o'clock, says the Captain. How inspiring to again behold the mountains! Morea for her size excels Tahiti. Their one peak is quite the counterpart of the Diadem in sheer abruptness and solitude. In fact, it stands more apart from its neighbors than does the Diadem.

At breakfast today, the Captain opened a bottle of wine and Mr. Beck got out a can of jam, luxuries we have not indulged in this

side of Christmas Island.

As we approach nearer the Morea reef off Opuno bay, red-footed boobies are very numerous. Saw a small white-breasted shearwater, smaller than Putu and larger than petrels, likely rostrata, the everlasting nonfindable Noha of Tahiti. Saw a noddy tern also.

The boobies are exceedingly numerous. One flock contained fourteen. We tacked three times to the point and then made one more short off-shore tack to get a better position for running across to Papeete. At three o'clock we have about eighteen miles to go.

We noticed two or three more Pt. rostrata and one smaller Puffinus, white below. This increases our hopes for success next week in finding their nests. Tomorrow I go after my guide and arrange to ascend Aurae Monday. Fanaue, the sailor who piloted our skiff to Motu Upoa, is the brother of Tuaurae, my Mt. Aurae guide, and will carry my message to him this evening. Perhaps he will accompany us into the hills. Approaching Tahiti, we find it much more interesting than last September.

The foot of a rainbow, only the foot existing, shines upon Mt. Aurae. May I find the pot of gold at the base of it in a colony of shearwater burrows! From what I have observed of Tahiti, I consider it one vast volcanic cone with two main craters, which are now represented by the valleys of the Popenoo and Punaruu, with any number of lesser craters, as Fantana, Vaihiria, and a number of radial vents now forming such chasms as Mission, Vaihiria, Outo, and countless others. But many thousands of years must have elapsed to permit the present stage of erosion to have been brought about.

How little one would suspect those green ridges to be impass-

able thickets of Lantana! The ferns appear slightly browner. Now the roar of the reef is very prominent. A little skiff is in the passage before us.

We anchor within hailing distance of the shore. There is Father Roget, lesee of Christmas Island, friends of sailors and passengers, and the C. N. O. manager. Now the hailing commences, and before it quit, it struck us severe blows. "Heave anchor and pull out beside two American schooners (or perhaps they are millionaire's yachts) and lie by until morning." I suppose the doctor is at dinner and perhaps has a club meeting this evening. It is after five P. M., excuse enough for a French Colonial official.

We should sight land today and reach port sometime after dark. I asked the Captain if he could enter at night, and he covered his eyes with his hand, saying, "The Moana knows the way home." He showed good judgment in using the machine, for we got out of the calm belt and into a good stiff breeze last evening. Since ten o'clock, we have sailed four or five knots.

The cabin boy says he knows we are near Tahiti by the appearance of the sky, which must be animal instinct, since it is too much to be human intelligence. But certainly the showers of the past two nights and days and the hanging clouds do remind one of Tahiti. I suppose we will still find plenty of water along the mountain trails and rain sufficient in the altitudes infested by Noha. The old man aboard does not seem to know where Upoa nests.

Thus far, the moisture laden atmosphere about the horizon prevents us from seeing land, but with the increasing sunshine it is dis-

persing, and about nine o'clock it should clear away enough to show us the islands. This entry will probably close up the voyage.

We pulled in close to the Morea reef at Opuntu bay, where a French cruiser lies stranded on the reef she struck when trying to enter that bay. We tacked off and came back in at Cook's bay. On the mountain between the two bays is a jagged ridge with a "pierced" rock on it. Beyond Cook's bay is a peak high and jagged, at the top of which is the famous legendary "pierced" hole. This was made by a Tahitian God who hurled a spear from Orefena and struck this mountain.

4:30. About seven miles outside the harbor of Papeete.

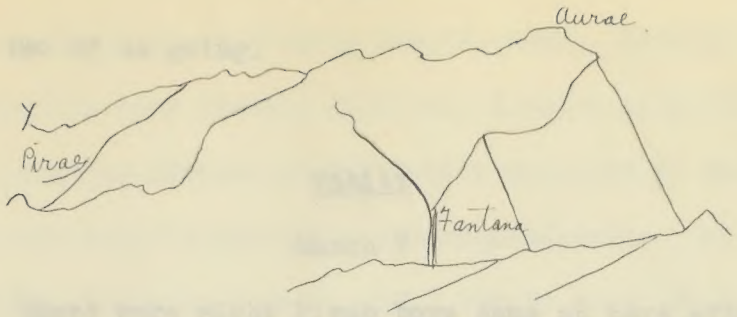
March 4

7:00 A. M. No inspector in sight yet.

Two gygis terns going out to sea passed the ship. A tropic-bird was seen up in Mission Valley. The upper falls of the East Fork of Fantana are visible from our anchorage. Mt. Aurae is only slightly enshrouded with clouds this morning. The fall above is formed by a stream draining a pocket at the summit.

8:00 A. M. No inspector in sight yet.

8:30. The doctor arrives.



X--Point reached in November on the farther face of which ridge Noha (Pt. rostrata?) nests were found empty.

Y--Trail we will follow this trip.

I rode a bicycle out to Pirae and found Tuaurae had rheumatism and could not go up the mountain, but suggested his newly arrived brother.

The myna bird is our one object of study now. The most noticeable thing about them is that they are, at present, rather quiet. Have not seen a free-for-all fight yet. Nor do they appear to be so invariably in pairs as was their custom before we left. How grating their noises are after the beautiful singing of the weaver birds at Marquesas!

March 5

Spent the day preparing for journey Monday. With one of the Christmas Island boys I will attempt to guide myself to the shearwater nests Tuaurae and I found last November. Nordhoff reports that natives at Papeari have informed him that Noha is coming in now. So there are increasing hopes. Tanaue was very drunk, and at first wanted twenty-seven and a half francs to merely show me the trail and not carry anything. He finally came down to twenty francs, but "no go if it rained". So I told him to stay with Tuaurae, and if we wished to take him we would pick him up Monday morning. The other boy is a little skeptical

of the two of us going.

Tahiti

March 7

There were eight Pirae boys came up here after feis today, for which we were exceedingly thankful. We distributed our bundles amongst them and made great time as far as their destination. I gave them ten francs in proportion to the size of the bundle carried. No doubt we lost a dove or two and undoubtedly a kingfisher by their reaching here ahead of us, but it must be an early worm that gets ahead for these birds.

My next sketch must be about the orange gatherers.

The trail that was very well defined last November at the close of the orange and fei season is now very thickly overgrown in many places. The fern belt is replaced at the third hill, elevation 1100 feet, by a Papilliaceous plant that has yellow flowers and is very tall and stalky. It covers the ridge along which the trail follows over a swayback.

The oranges are, at present, quite green. Fei seem quite plentiful. Many trees are in bloom. But blossoms are not typical of Tahitian mountains where green is the color scheme. There is one striking brilliant red bulb of a fleshy nature which stands a foot high in the thick leaves of a short fleshy plant along the trail.

In spite of my day's climbing, I slept but little, doubtfully five hours, but my boys are certainly sleeping hard and heavily. Is it not a note of interest that sleeping with others is always bothersome? These fellows had me quite crowded out of bed when I decided to

give up attempting to compete against them. Patate elevates his knees and they flop over heavily upon me. I think my pillow was the cause of the crowding because he has wholly occupied it since I arose.

Not all the Tahitians are mountaineers. Neither of these boys will carry things on a pole, and I had to show Ivi how to get strings from a fei frond. The house he built will not last until our return trip, mostly because he depended upon my climbing rope to hold it together. Will try to substitute fei fibres for the rope before we leave this morning.

It must be stormy at sea, for above the rumblings within camp comes the roar of the breakers upon the barrier reef some distance away. Between showers the stars are shining, but the foliage is too dense to permit recognition of constellations for time telling.

March 8

Apparently I had a very good sleep, because having written an hour or two does not make me weary and log-eyed. Strange that so little sleep is sufficient when exerting oneself as is necessary in climbing two thousand, five hundred feet and hunting about in steep valleys; while at sea, where all is idleness, one can never get enough sleep to satisfy himself.

My ability as a path-finder is rather deficient. We came to grief at the head of the fei bed with no trail in sight. I shoved on ahead and, ascending the ridge next Pirae, found a trail which led back to the ravine below camp of last night. Called the boys back there where we housed during a bit of a shower, then struck out by descending to 2200 feet. We then climbed a dry fern hilly slope or

ridge, crossing a tree fern ravine, repeating a dozen times--the Noha calls!--until we reached the trail that goes around the side of the mountain to the Noha camp. Again Noha calls! and again and again! What a successful man I would feel like to find one single bird! Certainly where so many are calling we should be able to find some used burrows.

We are in a waterless camp, and consequently it seems disinclined to rain and fill our set up buckets. That very energetic Noha now calling (there are two of them) makes me happy indeed, but will make me crazy with delight if he goes to his burrow and remains there until morning. I am whistling and he comes closer answering. Would that I could make a noise like his young! Overhead! The call very closely resembles the so-called whistle of the Wapite Elk, and makes me homesick for the Yellowstone.

March 15

We returned to Hotel Tiare where a new shipment of Americans were celebrating. Being well tired out and anxious to hear news from home on financial conditions, I sat around in the lobby, and even indulged in a little cocktail with the crowd, but drew the line on the second round. How the American does drink unreservedly, once he gets the opportunity! Like everything else he does, he drinks impetuously, energetically and unrestrictedly. Met Hall, Nordhoff and Middleton, the movie man, and was introduced to several others who don't matter much anyway. The girls of the hotel staged a Hula Hula for the benefit of the crowd--plenty of jazz and music. I see nothing so indecent in their dance, even though it be nothing but a hip movement affair.

March 18

Thursday Mr. Beck informed me that we set sail next day for the Austral Islands, and possibly Rapa. So after an hour or two of sleep, I arose and packed up. Friday morning was a very busy one, but I found time to visit the Mormon boys and obtain a Tahitian grammar, also a Tahitian-French one from the Mission.

My lad, Potate, worked strenuously yesterday and today. We went aboard shortly after four. Mrs. Beck, Max and Mable Yerex were at the dock to see us off. Had difficulty with anchor and did not get out of port until well after dark. The "Pro Patria" is a splendid schooner, with good officers and crew and good food and accommodations.

March 19

Spent this day in cleaning up the guns and making a dip net; reading college newspapers and magazines and Ellis' Polynesian researches, and writing letters. Calm sea. Using engine.

March 20

Still calm and using engine. Spent this day mostly reading college papers, but wrote a short sketch about "Your Polynesian Cousins", to be carbon copied for my children friends and relatives. Also read a letter to Dr. Campbell, mostly Polynesian researches, which, discounting a missionary's biased view-point is very interesting reading. He touched at Rapa and Tubuai on his way from New Zealand to Tahiti. From which this interesting quotation: "All that hope had anticipated in its brightest moments, was no longer to be matter of uncertainty, but was to be realized or rejected."

Rurutu, then, must be rejected, because to ornithologists it held but poor prospects, so poor, in fact, that we devoted our time to such very common things as the reef heron, white and noddy terns. The tatlers and plovers were exceptionally fat--"Aita manu" was the native's verdict.

March 27

Rimitara on the other hand, where we now are, immediately loomed up with the beautiful little parakeet of the genera Phygis, or possibly Vini,--a marvelously colored bird. The feet and iris are orange, green head and neck, with nape feathers dark purplish blue, as are the flanks and tibia and portions of the tail feathers; wings and back green, rump greenish yellow, as are tips of tail feathers; breast, cheeks, and abdomen cardinal red, as are portions of tail feathers. Then, too, there were warblers very common, and the cuckoo now and then was observed. Ducks and rails (as we surmise) are reported, so we are having an interesting time searching for possibilities. Of other birds, the white and noddy terns, reef heron, tatler and plover (?) are present. The ducks were obtained by tramping through dry ferns and weeds on the hill tops where they apparently resort for the day, feeding in the taro beds at night and early morning and evening.

Today being Sunday, I am not going to collect birds, but am going duck hunting, for it is certainly great sport for two or three fellows to station themselves on the different hills and drop the ducks as they fly overhead. Which shows that the hunting part of my work is still fascinating when I spend any holidays at it. The ducks have their revenge, however, when we make up the skins. They are exces-

sively fat and at the same time very tender skinned, and therefore it takes an hour or so to scrape them clean. But that is the work we get paid for, so we should not grumble at a little trouble. Mr. Beck remained aboard all day yesterday skinning, while I hunted, which makes results very noticeable, as he will skin and make up thirty birds in a full day, and that with ease. Personally, I show a little improvement, a warbler requiring only three quarters of an hour now, but I am still unable to do one to Mr. Beck's two, the present ratio being about two to five. When working, I write all the labels, which helps him somewhat.

Friday night I slept ashore to search for rails in the Taro beds late in the evening and early in the morning. No results! I intended to write, but forgot to get some candles. I tried tying cocoanut leaves into long bundles, but succeeded in tying two while one burned. Managed to get a breadfruit and a taro root cooked that way, but did not feel like writing under such conditions, so let the fire die down and curled up on some banana leaves, dead and dry, to sleep.

Near the taro beds the mosquitoes were quite plentiful, so I spent the night fighting them instead of sleeping. About one o'clock I went after a couple of cocoanuts which I had stowed away near the trail in the evening. It was very moonlight in spite of clouds. Two cans of sardines and one of jam were luxuries of civilization, but tonight I am going to sleep ashore and live off the bounteous surroundings. This island has four floral regions: the dry ferns of the hill tops, with scattered ironwood; the reeds and ferns of the level swamps where taro is cultivated; the cocoanut foothills and ravines; and the hibiscus woods which cover the exceedingly rough broken beds of elevated coral reefs.

In the latter region I purpose to spend this night, hoping to find something new in the bird line.

BOOK XII.

Hamuta Ridge

Voyage to Rurutu and Rimitara

March 7--March 27, 1921.

Pirae - Ridge Trip.

March 7.

Everything went all right this morning, though we had to hang on outside the stage. I am a little disappointed in Ivi, because he doesn't care to use a pole for carrying his load of canned stuff. Potate has a heavier load than I. Eight orange gatherers are climbing the hill with us, and fortunately for us because they relieve us of extra burdens.

First hill just above mango trees registered 400 feet, the next hill 700 feet. Two months at sea is not conducive to a mountaineering wind. Where ridge is next Hamuta, 1100 feet before first drop. In little ravine facing Hamuta around ridge just before going around into Orange Valley, 1200 feet.

I gave the orange gatherers ten francs for their help, figuring that it helped to give us a good two hours more of hunting and skinning time. Everything now has the traditional greenness of the tropics, far surpassing the verdure of last October. Spring here, of course, means but the rainiest months, which apparently are from

December until March or April. Rain yesterday soaked up everything, and it looks threatening today. They are a jolly bunch of fellows, these orange gatherers, and what a picture the movie men lying at anchor in Papeete harbor are missing!

We are up the Hamuta but a short ways at an elevation of 1650 feet, and the rain is already commencing. Poor success is likely to result unless we get some sunshine, for even Upa and Ruro, the dove and kingfisher, will not move much in the rain, and it will be hard to keep things dry.

Stopped at highest oranges near a large rock beside trail. Left one boy, Ivi, to get fei and cook them. Sent Potate back after water. Hunted around, but could not get a shot at the kingfishers heard.

After lunch we left Ivi to build a house, and Potate and I went back down trail. We neither saw nor heard a thing of Upa until at 1900 feet, where three were in a tall tree, but they flew upon our approach. Saw a bird alight above leaves and shot it,--a myna.

We hunted on down to where the trail left the valley at an elevation of 1600 feet, obtaining one dove of half a dozen seen, invariably in pairs. They did not call of their own accord, and only one answered my call. The one obtained was at an elevation of 1850 feet.

The myna is very wild here. I usually see them flying away from our approach to other side of the valley. Kingfisher observed, but not obtained; they also are wild here, probably because the trail is used so much by orange gatherers. Returning, one or two doves passed over me while calling. Mynas are plentiful, but even they did

not come within reach of auxiliary cartridges.

At camp we have had two big meals on fei. What a blessing to find such a tasteful and filling food up here where it does not have to be carried on your back! It is also somewhat of a blessing to find oranges along the trail. They are just beginning to get ripe, but are very good eating even now.

Camp elevation 2400 feet. This evening we heard the jungle fowl, or it might have been a domestic chicken's wild descendant. The crow seems to be the same. Except for the possibility of the young or the nests getting destroyed, they have everything their own way in the dense lantana thickets. I should judge their food would be mostly insects and worms, which are more than abundant here in the tropics. It clouded over but did not rain this afternoon.

March 8

The bird Tuaurae last October called Noha commenced calling before I retired at about eight P. M. (I am watchless this trip.) Heard only one or two calls. Had three showers during the night,-- lucky I had an addition built upon the house the boy thought sufficient! The boys are such heavy sleepers that a good ear is necessary to detect any distant calling.

The bag of rice which we had at Christmas Island and back, and into which I failed to glance before starting, is full of weevils, but I am going to try washing it off if we reach running water next trip. Fanaue would certainly be objecting to traveling in this rainy weather. If I find nothing, or hear nothing, about the shearwater nests, I will return here for a day of dove hunting. I saw hawks three or four times

yesterday while calling doves. I believe thay came with the hopes of catching the "cover", but it may be pure curiosity rather than deception. Getting a short glimpse of them passing over the tree tops does not permit shooting them. Promise of a rainy day ahead, which means no land birds. No wonder so few collectors ever penetrated these mountains seriously! Not once since October tenth have I come into them when it has not rained, and usually quite heavily. Quite different results might be obtained in good weather when birds are calling and moving about a bit.

If both boys were not snoring noisily I might hear a chance Noha calling. Although awake until within an hour or two of daylight, I heard nothing further resembling Noha. An insect, I believe, made a clucking noise and answered when I clucked as Americans often do to their horses.

A few more showers, the last heavier and longer than usual, came before day-break. With the dawn, the mynas commenced their robin-like calling, but later got to cawing and croaking about us like jays.

A kingfisher scolded us with his chattering call from the orange trees overhead. He flew a short ways twice when I tried to get within auxiliary range, so I used a large 10 on him. Captured him safely enough without injury. Am tempted to try getting some mynas, but hope there will be other birds, at least a hawk or two along the trail. The mynas appear to be more in flocks of three and five than in pairs. Heard a rooster crowing down in the Hamuta valley below us.

We were just about ready to hike when a heavy shower came upon us. It is a rather foolish thing to go on in the rain, but we will at least go to the shearwater nests, camping in the fei if I can

find them. Not a sound of bird life is heard in the rain, even the myna lacking a call for rain.

Could not make out the trail through fei bed, where too many food hunters had led off it. So when we got hung up by brush beyond some orange trees, I bulled my way to the summit, and then decided that I was on the wrong ridge, and, after going to its juncture with the next, I found the only trail signs on my own ridge, and, following it back, I struck a well defined trail which, however, led down into the first ravine below last night's camp; came up and got the boys, and we just reached camp to get in under shelter for a heavy shower. Am off again to follow this trail until we get lost next time. Doubt if we can make the fei by night, as it is now near eleven, but shall get up that way at any rate, probably to the tree fern ravine just before the trail cuts around the ridge. From there on it will be hard to follow.

From the house we descended to 2200 feet and then went up the ravine, and are now stopped at 2700 feet beneath the last orange tree where some one had made a camp and left for us to find a tipi, much better than our own in the brush below, the old camp of perhaps two years ago.

I hope the rain is over for the day, but expect more this afternoon just as we get about to our camping place. It is nice and cool along the trail, but up on the ridge it will be chilly in the wind unless the sun comes out. It is very near noon, but I hope for sunshine for lunch.

Ate lunch at an elevation of 2850 feet on an open ridge where sunshine dried the rain out of our clothes, but now threatens to sat-

urate us with sweat. Saw two hawks, both with whitish bar at base of tail, far below in Pirae Valley. Myna extends this high and is all along the Pirae canyon wall below us. Observed two swallows just above our lunching place from next hill at almost three thousand feet. Fearfully hot in sunshine. Clouded over and a storm out at sea. Saw three more birds which might have been swallows but their flight looked unusual.

We dropped down into ferns, and at bottom of ravine joined the trail we were searching this morning. The packs are getting very heavy at 3350 feet, where we make a steep drop across sway back where two opposite ravines have taken away the usual knife-edged ridge. Rain is commencing again and we are in for a wet night, probably without water.

The next hill, after a terrific siege of tree ferns and dry ferns, registers 3500 feet. It is a small, grassy, round-topped nob, a beautiful campsite but for rain and water. At this place I had the boys search for probable petrels under the grass as they were at Motu Tabu. At least 3:30 and we have yet a ways to go ere we reach the place where Tuaurae filled our canteens. There I expect to camp for the night in order to avoid a similar experience to ours last October. Should hear Noha if any are nesting on this ridge tonight.

Pirae canyon is a marvelous affair, and I think I shall make an excursion clear to the base of the head waterfalls coming down out of the three or four little valleys near the summit. From the time it commences we can see the most of falls in three leaps at least two thousand feet, because its head seems as high as we are, and Pirae river can hardly be more than a thousand feet at their base and its

head. The pocket in the canyon wall opposite also has its waterfall, or the waterfall has left its pocket. A fog commences to fill the valley ahead of us. But it lifted again; "Hupe", the boys call it. There is my rainbow with its base upon the ridge beyond Pirae Gorge. Does it mean my pot of gold, or holes of Noha, are over there? We must soon reach the ferns ravine, beyond which we have one glorious time. No, I think I'll camp here for the night.

On the ridge just between this hill (3550 feet, and likely our highest spot) and the last, I found a feather of the hawk introduced and able to survive, and beside it, several pelets of rat fur and bones. Does the hawk disgorge? Or would it pass out otherwise fur and bones in a pellet? I was about to remark awhile back that this bird was introduced to kill the rats, but probably subsisted entirely upon birds. I could neither find a feather nor bird bone, that I knew, in the pellet. Perhaps they get a few rats then, and so pay for their keep. But I like not the way they so frequently come about when I am calling doves. It looks ominous.

From the next hill, where another fern ravine intervened, I could see the fei bed, and beyond, the water-fall just below the Noha ridge; so we are pushing on to it. At present am but a short ways from fei. I may even be so bold as to essay an effort for water tonight.

We had splendid success arriving at the fei, holding the trail easily; but wanting to be sure a good house was built, I put off going for water too long, and, finding the trail obliterated by fallen trees, I gave up the attempt. So we drank the quart canteen full at dinner, and ate a small can of beans, a can of tongue and some jam. Oranges,

though sour and green, went well.

It is hardly an hour after dark, but we have heard the unfindable Noha very frequently this evening,--about one call every few minutes. Their call is a "whangck", ended with a whistle, which latter is heard at a far greater distance. Now comes a lull in the calling, so all I heard might merely have been one or two repeating.

But they continued as I went to bed, and when I awoke and listened, they were calling still. May they prove plentiful enough for us to find at least one bird! I do not know what time it is, but, judging from the fact that I feel perfectly refreshed from sleep, it must be well past midnight. We have four large fei leaves with the main ribs draining into pots and cups. It has just started to rain, and I hope it comes hard enough while it is about it to give us a good drink of water apiece.

March 9

This mountain is very wet, and, judging by appearances, has been overly wet since October. Trees are fallen over in many places, obliterating the trail between here and the water, which was none too good in the first place. Being able to see the country last evening does not help in the working about here, because it makes us too cautious to know that a cliff three or four hundred feet or more is below us, and above it, none too gentle a slope. Now that we want rain for drinking purposes, I'm afraid it is not going to amount to very much.

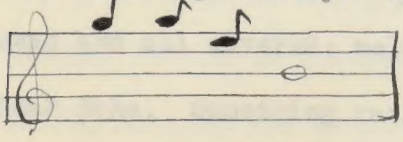
There are some cries out in the darkness which differ decidedly from Noha's call. May they prove to be another species! I have told the boys that we don't go back until we find Noha. Today I'll offer a bonus for finding them.

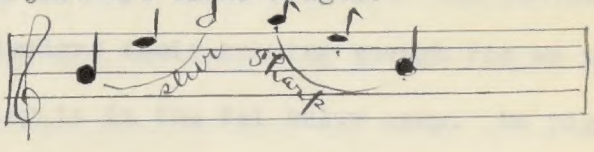
A Noha whistling answers my whistle, or calls more frequently when I whistle, even approaching very nearly overhead. Very close now. Now farther away. In the distance another is calling. With very little more volume, their notes would almost exactly resemble the so-called whistle of the Wapiti Elk of the Rocky Mountains.

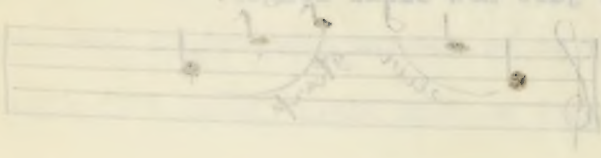
There are very small fei here, but I hope to find a more developed bunch this morning; without them, our grub will not last until Saturday; with them, it will. The rice is going to be a problem, because we must take it to the stream in order to wash out the weevils. With it, we will have plenty of food. This morning with the two machettes we will go after water, breakfast, then hunt Noha all day, and return in the evening to camp.

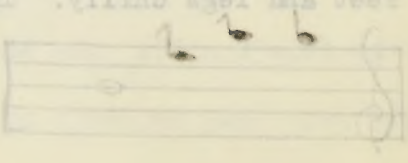
Were it the time of the full moon I should be inclined to spend a night beyond the water on the Noha ridge, but there is not much use when it is so dark. Will look it over tomorrow and may do so Thursday. I am just thirsty enough to be irritable. It just threatens to rain, that is all.

Noha just called overhead; this time it was a sharp whistle with a groan following. Usually they whistle a long yodel, giving three notes after the first one. As a musician I am very poor, but I do believe this attempt just about gets the whistling call of Noha, while the groan often following the whistles drops an octave below. One has been whistling repeatedly for several minutes. Thunder and wind,--feels foggy. A sweater, and a warm one, is just comfortable. Feet and legs chilly. The bird just now calls longer.







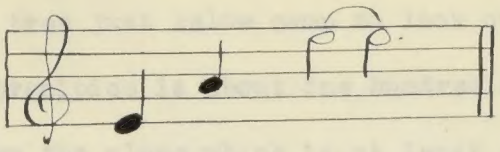


Here are these birds coming into this valley or along this ridge during the darkness of a foggy night. How sensitive to bearings must they be to do so! The calling, perhaps, is nothing but what we do ourselves when we think we are within hailing distance of camp or other objective. According to Mr. Beck, the two birds come in to nest together and are found digging the burrow and on the nest for a considerable time before the egg is laid. It may then be possible that they come in on a bright moonlight night, or even during the daytime to locate the nest. Afterwards, if one always remains in the nest, the other would be directed by answers to its calling. Once the young is hatched, they would learn its call in a day or two, and then both could leave the nest and fly far to sea in search of food. I would like to band all the shearwaters nesting on Tabu and Upoa, Cook, and other islets at Christmas, and then see if any nesting birds were picked up at sea. Our experience with the downy young on the ship proved that the nestlings can go for two weeks at least, and not only retain their fat plumpness, but also have a considerable quantity of oily matter in their stomachs. The question, with thousands of others, remains unsettled as to how long the old birds are absent. Close observations would be necessary to prove such problems. That six-noted bird continues his calling as if it were great pleasure. Is it not possible that it may be a bird entertaining the nesting mate? These birds have decidedly different notes from the Upoa and Putu of Christmas Island, where only coarse groans and sharp staccato chittering predominated.

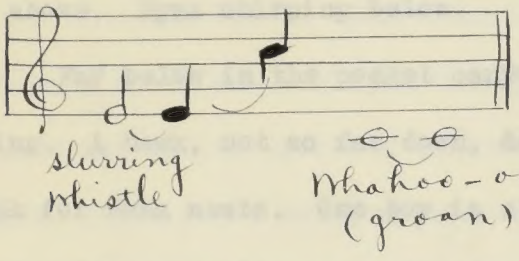
My two boys are closely packed in an army blanket and canvas, head and all covered; well, it deadens their snoring enough for me to hear Noha. Something rather noisy is in the fei below camp. Do pigs

come this high? If so, good-by Noha, unless you dig a deep burrow amongst roots!

Another bird is calling, unless the former has changed its song.

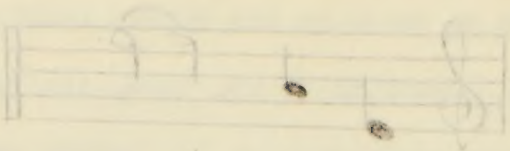


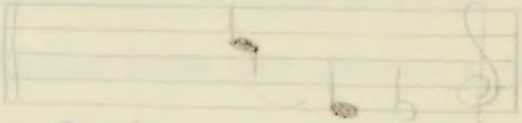
Here comes a whistle-groan call, the former being just such a whistle as one usually beckons a dog with. And at my imitation of the call, he answered and I heard the flutter of his wings.



I skinned out the kingfisher, and during that time a slow drizzling rain or dripping from fog on trees has commenced. Noha became very quiet and is now not heard. I wonder what time it is.

It was, perhaps, 4:30, because daylight soon came. The fog collecting upon foliage and dripping upon our spread of leaves resulted in enough water for tea and mush for breakfast after each of us drank a cup full. So the birds I heard while writing this and skinning Ruro must have been on their way out to sea. Obtaining drinking and cooking water by use of the fei leaves adds one more benefit to its already large list. In spite of the wet weather, we had a very soft and dry bed upon the old dead leaves, which, being sheltered by the living ones, are usually quite dry. Above us we had a shelter of good waterproof leaves; beside us a bunch of feis to cook this morning for food. Food, drink, shelter and comfort,--all supplied by this one plant is close to





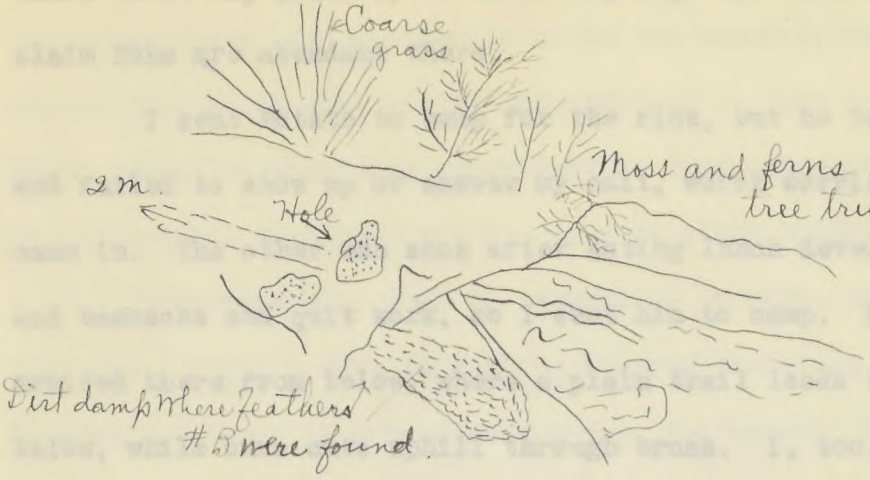
the cocoanut's record. No noises this morning since daylight, but we go forth with hopes of success this trip.

Must cut a trail to the water, as it is obliterated by fallen trees. I have climbed a tree just below camp to look over the situation. The brink of the precipice is about one hundred feet out, and perhaps as many yards down the slope which is at least 45°. The Noha ridge is about two hundred meters across from here, with another as far above us. May they be well inhabited! At present, clear weather prevails below so we can see Point Venus. Clouds threaten plenty of rain above. Myna chirping below.

Far below in the pocket canyon, or gorge, a bo's'n bird is soaring. A hawk, not so far down, detracted me a moment from the search for Noha nests. One boy is still digging at a hole we struck in fern ridge very long. He traced it to the end with no results, eight meters in length, and all the way about 20 cm. wide and 10 high. It ran uphill and veered off to one side.

We ate lunch beside the hole and burrow in ridge just above the water, which Ivi dug to its end. It entered the ridge underneath a small clump of ferns, and, after going one meter, turned uphill, where it continued fully seven meters, finally swerving off ridge where it ended in a large roomy hole, 50 cm. in diameter and 25 cm. in depth. Here feathers # 4 were found, proof, at least, that a white-breasted bird made and occupied the hole. I thought, barring rain, that the hole looked fresh, and left the boy to dig it out. The length of the burrow might have been due to the fact that rocks prevented making the room, which is situated at the first place where the soil was deep enough for it, and was down to rock itself. Here we are going to

spend most of the afternoon searching for more holes like it.



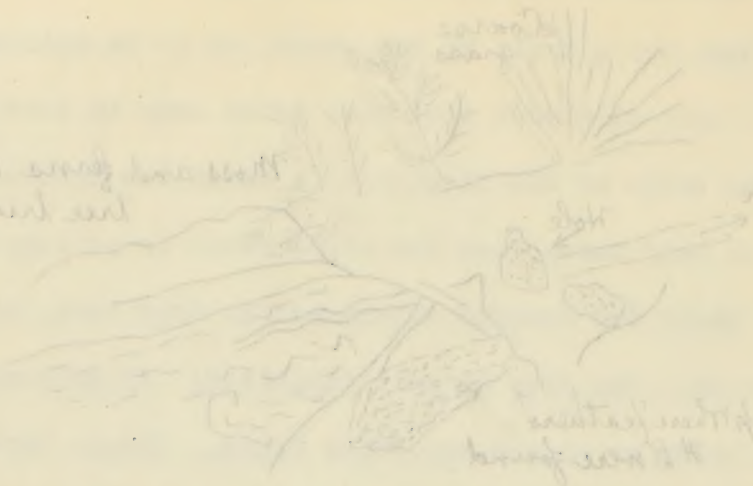
At elevation of 3725 feet, above where I found feathers last October, I found a new looking dirt dump with some old feathers in it. The hole was again beneath a tree stump and was a regular house, from which we could raise not a whimper nor find anything further.

Found one other hole begun, but rocks were met with and it had been abandoned. Rain may make fresh looking signs appear old. Am working up the ridge. Both men busy.

We ascended to an altitude of 3850 feet, where ridge became so overgrown with ferns and underbrush that birds could not take to the wing, so returned, looking at all likely places.

Found skeleton of a goat in hole beneath tree stump. Many tracks seen. I have decided upon sleeping at this vantage point tonight, rain or shine-of-stars. From here I should be able to tell by the direction of the most calling just where it is best to search tomorrow. Or it may be possible that they will come within range of a good fire.

Two tropic-birds are far down in the valley below us; their nests are more inaccessible than Noha's, Moarva. Three more in the



side gorge, or pocket. My next trip should be along the ridge opposite, where there may possibly be something high up; Tuaurae and his brother claim Noha are abundant there.

I sent Potate to camp for the rice, but he took a lower trail and failed to show up or answer my call, which worried me so that I came in. The other man soon after eating lunch developed a headache and backache and quit work, so I sent him to camp. Found Potate just arrived there from below, where a plain trail leads into the fei far below, while ours cuts uphill through brush. I, too, took that trail and did not discover my error until I yelled and heard answer above.

I then started Potate to work peeling and skining the very small fei, which were all we could find this trip. Then, with the canteen pot and rice, I returned to the creek and washed all the weevils out of the rice; then, with pail full of water, returned to camp. Afterwards, cut out trail and got large pile of wood. The rice being cooked and fei about done, I am going to eat and go to my sentinel post on the ridge, with candles, note books, one blanket and old canvas, matches and tipi. What will the night's vigil reveal?

Observation Post: Just dark when the first Noha comes whistling up the valley. He is beyond camp from me, towards the ridge we ascended. Now a different call comes from the same direction.

If I go to sleep, the dampness and chilliness of such an exposed position will inform me when the fire needs replenishing. My fern mattress is a bit damp itself. The sky, however, is almost clear, and so, with good luck, I may not even get a fog. Point Venus bears N x W from me. Orion is about 15° off the meridian. I judge it is about seven o'clock.

One Noha off to SE. Just about sundown, five myna birds flew past from somewhere up country. How high up have they gone, anyway? No wonder there are no other birds in the country, for whatever is edible (and a lot that isn't) the myna eats. Very likely the other birds perish as much from starvation as from persecution by the myna. Is it possible that they eat the eggs of other birds?

Unfortunately, I am to leeward of my fire, which is hard upon the eyes. Still a Noha is calling towards the ridge beyond camp. It is possible there is a nest over there, but where? Here is a black ichneumon-fly which has singed his wings in the candle flame. The fire is down to coals. A Noha close by, and one calling toward the ridge we shall ascend tomorrow. Another coming my way; one distant down the valley. They are here. Why can we not find a fresh hole? There is one flying about the ridges above camp and calling quite frequently, now near, now farther away. One bird can make a lot of noise, no doubt making some natives think there are many more birds here than there are, which would account for their claiming that they are plentiful everywhere.

The boy Ivi will go in tomorrow unless he feels better, as he did tonight or this afternoon going to camp. He started out with a cane, but I could not overtake him. The rice washed out splendidly and made a full pot, of which I indulged freely. If Ivi goes in tomorrow, (and I hope he does), Potate and I can do well on the grub at hand for several days.

One Noha very close, another far down valley. Occasionally very distant calls come from the ridges across the Pirae Valley. Old six-noter is coming in; he has quite a melodious call. The one above

camp, or it may be another, still calls. Now comes a mocking voice from this ridge where we searched today. All right, old fellow! Survive and propagate your kind, for your burrow is safely obscured. And again he mocks me. Well, let's hope he has a nest high up on the main ridge, and that if Potate and I get that high, one of may stumble into it. (My B. V. D's just went up in smoke; so I gathered in the rest of my drying clothes.) There is a crane-fly here with a body about the size of a mosquito, and legs more than four times as long as body. An Amar moth just dove headlong into the fire. Lightning NW.

Judging by Orion's position, it is about eight-thirty. One or two Noha have called fairly regularly from above camp and up on this ridge. Just now came a new call, a sort of low cluttering note preceding the whistle; just made the once. The sharp ascending notes are most frequent tonight. Old six-noter has ceased some time since. Perfectly clear and starlight now, but will it last?

9:00 P. M. by Orion. Still a shearwater out in valley east of me calling. Now one above camp. That seems the most likely place, and tomorrow Potate and I search there. Except the one bird, I have heard nothing where we were today.

10:30 by the stars. Awoke rather cold, and made up the fire. Two Noha called, one above house, one east of me. Later, a six noted call was heard three or four times.

11:30. A very cool breeze comes down from below the Southern Cross. At least one Noha beyond camp is calling. Here comes another directly from the ridge above camp where we go tomorrow. They both call so regularly that I suspect them of answering one another. The one gets more distant, however. Is he going this early to sea?

12:00 P. M. There were two birds calling when I first awoke. One continues very bravely but grows faint. I have swung my bed around so as to get more advantage of the fire heat. There are apparently two calling alternately, with but a slight distinction between their voices. It is pleasing to hear most of the calling above camp, in which direction we will work today, with hopes of good results. My observations tonight induce me to think that the birds are not very numerous here,--perhaps half a dozen pairs.

2:00 A. M. One or two birds calling. One very near.

4:00 A. M. One or two birds calling, but I could not keep awake long.

4:30. No birds calling nearby, but one across the valley is a little late in leaving for sea. My one light blanket is far from sufficient on this exposed ridge, although I am wearing trousers and sweater. The warmth of the fire is quite pleasing. My tree stumps lasted very well. Dawn is just making an impression upon the opposite ridge. White birds these shearwaters are, that they can fish all day at sea, and call all night near their nests on land. Of course, the calling I heard might have been from several birds, but even then, they show rather nocturnal habits. How much and when do they rest?

March 10

With these first faint rays of light comes the chatter of the myna from below. That Noha across the valley is rather late, but his call grows steadily fainter and farther away, and soon he will be skimming the billows. How fortunate to have such a life, half mountainous and half sea! At Christmas Island we saw shearwaters during

the daytime flying about the islets on which they were nesting. Why do we not see some here in the daytime? Darkness still lingers in the deep gorge below, and a few stars are still visible. Clouds lurk in the NE. How fortunate that it neither rained nor fogged up last night! I was cold enough dry and with a good fire.

If the higher altitudes are going to reveal anything new and interesting, I should almost expect something in this little ravine here. Water is present, and it is well wooded but not very steep. The clouds east of the Aurae ridge are picturesque tintings of a hue and color beyond my vocabulary. The ocean surface shows areas of ripples with crooked streaks of calmer water running through them, and some large spaces apparently calm.

This morning I found both my men in bed; Potate was sound asleep, Ivi petting his illness. I built a fire and heated the rice and made tea. Paid off Ivi, and he struck out for Papeete with a cane, apparently feeble, but I dare say he soon limbered up. Perhaps this altitude does not agree with him. There will be very little food left when we return, so Potate and I can easily carry the loads. This will allow me to stay up here until some time next week, as we can live on rice and mush, with a can of meat every other day or so. Potate is a little brick, chock full of energy, and as quick to learn where to hunt for birds as he was to know my wants when sick. I talk English to him, and no doubt he will soon pick it up.

We took a trail which I thought would lead us to the other Noha ridge, but instead it follows along the base of cliffs just above camp. Hoping for swifts or cliff-nesting petrels, I am following it to the end. There might at least be swallows, in fact, we just saw two, but they did not fly around long enough for me to get a shot at

them. This cliff is an ideal place for birds desiring holes in precipitous rocky ledges. Here are holes which surprise me, and I can hardly believe them to be the work of water, but below one of them was a hollow ground, vertical groove such as a trickle of water in countless centuries will wear. They range from just large enough for a man's fist, to some big enough to crawl into. One was three or four feet across, but very shallow; it had holes running in two directions about the size of a man's body. All holes that I cannot see to the bottom of I have sounded with long sticks, but not a sign of bird life have I found. This is just about where those birds beyond camp last night were located.

Elevation 3656 feet. Goat signs all along. We came to grief at a waterfall gulch without the water, so returned, trying all the holes again as we went along. We kept a sharp lookout for the trail, and easily found it dropping into a ravine, and thence around to the ridge opposite the stream from last night's camp. Here we found the old hole dug out by Tuaurae last November with no results. Below it, a new hole had been dug not long ago, but it showed no very recent signs of life. However, knowing it had been dug out within four months, I photographed Potate listening for Noha at its entrance. Heavy fog now envelopes us. Just below the tree we found another very short unfinished burrow; before it were feathers # 6, which appear to me to be rather fresh. We will spend the rest of today here searching for a fresh burrow, and, when in doubt, digging out what we find.

Three such holes are here, and, whilst I search for more, diligent Potate is digging them out. I worked my way over to the creek and had a drink. It makes its way down by a succession of small water-

falls, until it makes the grand descent of several hundred feet, just one fall below the crossing going to last night's post. It must be about two o'clock, as the fog and rain usually commence about them.

The fog came sometime ago, and it is now raining considerably. Well, if we could but find one Noha, I would not care how wet we got, but to not be able to locate them hurts me terribly. Thanks for a large fallen tree, we are able to keep in out of this rain, but it is cold being still. What a job is this searching for a little bird hole on a whole mountain side! What is a needle in the haystack in comparison? One does have a chance of sitting down upon the needle, but his chances of stumbling into an inhabited hole are slim. Were it such a night as last night, with no prospects of rain, I should be tempted to come up here to sleep. It might aid a little in locating the inhabited nest; I am beginning to doubt that there is more than one.

We ate our lunch of buttered hard tack and rice, which latter I carried in my army canteen cup; I spilled a little and filled rest with paper, but by the aid of our inevitable tipi we managed to eat it. Returning along the cliff, in one hole I found the skeletons of two rats, the skulls of which I kept for the possibility of determining whether the imported or Polynesian. Raining very heavily and steadily, and dripping through the tree trunk under which we are squatted. No noises at all except patter of rain upon the leaves.

Apparently it intended to rain regularly, so we made a break for camp and arrived there just in time to miss a heavy shower. From the eaves of our house we caught enough water to fill all possible containers, a quart pot being filled in a very few minutes. While in camp, we cooked up dinner of corned beef and rice, with rice and sugar for desert, and tea. Had a terrible time making the fire burn, so,

having an hour or so of daylight left after eating, we went over to my camp of last night and got caught in another rain shower because I found another nest, from which a stick brought no noise, and where no fresh signs appeared; so I left it for further investigation before we leave.

Cut down three good sized "posts" of the trees that made me such a good fire, and we brought them and a pot of washed rice and water back to camp with no little amount of exertion, because one hand was always used to cling on to roots and trees. Going down, I slipped, and but for my arm crooked around a tree branch, I had taken a real slide and fall of no few feet. With the frying pan full of rice stew, and this pot of boiled rice, we will be able to eat a while without cooking, which will save time if weather will only permit working.

This evening, Potate of his own volition walled in our house on three sides, which should make it less chilly at nights. The wood we brought back does burn well, which is gratifying. Not only does it burn well, but is very hot. The coals would make a good Dutch oven fire. Potate is now peeling the rest of our fei for tomorrow, though they should be used tonight to prevent discoloring. We have at least one more, and I think two good pots of rice after the weevils are washed out of them, so should be able to hold out easily until Monday. We will return to oranges early Tuesday morning, and camp down where the doves were observed. If I get but three or four of them we can hold out an extra day there, since Potate is willing to exist on fei and oranges if nothing else is to be had, and I anticipate the experiment. How different is this to the Popenoo trip where we ate so much canned stuff, yet how similar in the disappointment of not finding the

Noha! My aim tomorrow is as high an altitude as possible, looking for Noha as we go. The best trail should also be the most likely place for nests, as there the conditions necessary for flight would exist.

Darkness sets in with the sky slightly cloudy after an afternoon's rain. Noha has commenced calling before dark. I went out, but could see nothing of the bird. Had it only been last evening while I was at a place which surveyed the surrounding region! After four or five calls, continually getting fainter, (which makes me think the bird dwells farther inland), all has become stillness once more.

I have written letters for about an hour and have heard no further sounds from my Nemesis. Am a bit weary from last night's vigil, and so will turn in now, hoping to awake when the morning calling is at its height.

Just after the candle burned out, the first calling after dark was heard. It was not then eight o'clock. This bird called around several times, very close by. Somewhere on these jungle covered ridge spurs must be an inhabited burrow. May our food last until we find it!

We slept rather chillily during forepart of the night, Potate shivering considerably. My jersey helped me, but was not warm until I pulled the tent floor from below and put it above us. In a frosty country canvas does little good, but here where moisture is the coldness, it helps considerably. Whenever so awakened I heard the calling of a bird or two before getting off to sleep again.

At midnight, when I stepped out to look at the stars, I still heard at least one bird calling. Then it was that I added the tent cover to our bedding and slept rather soundly till daylight, but I

recollect something of calling not long before I arose.

March 11

We did well to bring that wood to camp; it burns without fanning or coaxing with candle grease. Yesterday I found a bit of a tree stump very heavy with sap, which so resembled a pitch-pine stick that I tried it on the fire, but it refused to burn. Wood which has been dead but a year or two is very poor, rotten wood being the best as a rule, with the exception of this ridge growing hardwood we brought in yesterday. Those trees were killed, I think, by a fire and still stand, which prevents the wood from becoming waterlogged and saprophyte infested, the brown hard portion burning the best. It can be recognised by the very distinct median rays, as prominent as those in quarter sawed oak.

Breakfasted on Mulligan stew with fei, instead of potatoes and rice, for all the other constituents. The fei gives it that color of currie, but not the flavor. Flies, many of very interesting species, are very numerous at this camp, no house or blow-flies being observed. Yesterday I found a snail of a flat coiled shape, of which I collected a couple. Very scarce, and found in different conditions such as old tree stump and cave. There are two very common species of land snails found practically all over the island with many color variations.

Two days have passed with naught but old holes and feathers the first day, and unfinished holes and fresh feathers the second. Will this third day's search be a lucky one? I certainly hope so.

Myna birds heard while breakfasting. They must have searching for fei and other food. I observe they are very thick wherever the

fei is found.

Into our wet clothing, and afield with the rising sun, about seven o'clock here. Searching again up the ridge without any success, until we arrive at the old diggings. No mine is ever so well worked but what a nugget may yet be found there. In one of the dug out holes I saw signs left during the night; but Potate, looking into the other hole, saw Noha himself. VICTORY at last! The bird was in the unfinished burrow we dug out yesterday. His breast, the tips of his tail as far as tail coverts are muddy; secondary wing coverts at base of primaries muddy; top of head slightly muddy; bill very muddy; tips of primaries muddy; feet very muddy.

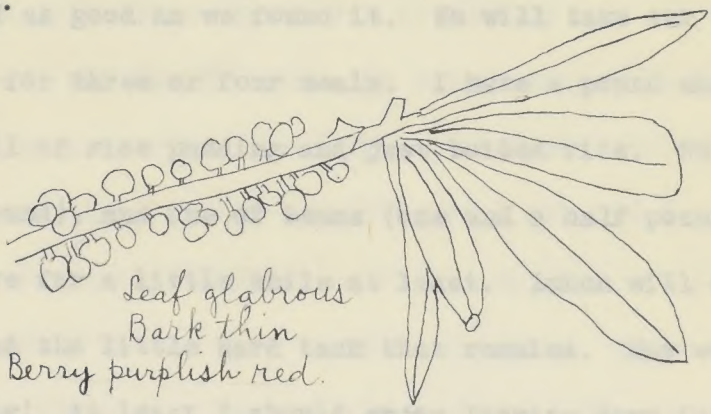
The unfinished burrow is, this morning, about three feet farther back into the hill. There was also some digging in the other hole. Instead of digging them out now, I am going to leave them for the chance of further visitors. Nothing results from poking a stick into them, and the destroyed holes are not so apt to be visited. May sleep here tonight.

This is the happiest moment of my six months of collecting. The finding of Porzana tahitiensis was a thrill, such as comes from unlooked-for success of chance; but this capture of Noha is the result of persistent and trying efforts. Now to wash the mud off his feathers at the creek; which done, we will hasten back to camp with him, for a fog envelopes us and rain might spoil this invaluable specimen.

Returning, Potate and I ascended this ridge as far as the goat trails went. Where the ferns and ieie became too thick the goats took off to the side, and we did likewise, passing some splendid flight openings, but soil was poor for digging and rocks too prominent.

Finally, we ended up at the little stream, and, deeming it worth while to search along such an unusual place, we have ascended it to an elevation of 3800 feet, where we ate our lunch of rice, beef, and buttered hard tack beneath a tree laden with a small cherry-like fruit, which we have frequently found in the crop of Upa, the green dove, Ptilinopus purpuratus. Evidence of something having eaten here recently led me to this stop.

I have called for both Rupi, the blue pigeon, and Upa, without success. Of course, one should not expect too much during a fog. I saw a swallow, but nothing else has shown up, and, as we are getting chilly, we must go onward. The Marquesan waiting beneath a kiki tree for birds to show up does not suit Tahiti very well. Birds are too scarce here.



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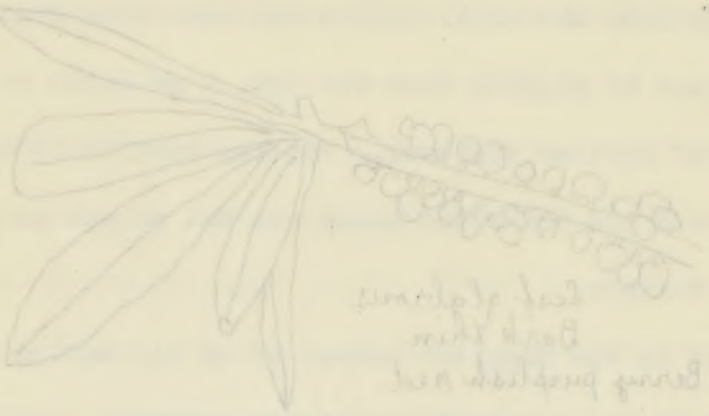
We whcked our way up a ridge to summit of main ridge leading to Aurae, where we found the cutting marks of an old trail along the ridge, no doubt that of Gauther, the photographer who came up here to take pictures. We followed down trail to next peak, and found the going so good that we might attempt ascending the mountain tomorrow and Sunday. That were indeed a Sabbath upon such a commanding summit! We are again drenched, as it has rained since noon. Fantana roars far below us amidst the fog, while thunder rumbles towards the mountains. No signs



of Noha along this ridge, so far. Tomorrow we may strike some favorable nesting places. Elevation 4000 feet, as high as we have been this trip.

Back to camp, where I skinned out Noha, while Potate kept the fire agoing. We dined upon ripe fei, rice, rice-pudding, one spoon jam, one spoon sugar, one cup rice, and tea. We now have a pot of oatmeal and Noha cooking. Noha will flavor a pot of rice, and when we get good and hungry on our hike tomorrow, will taste very much better than they did when we were well fed up on the Moana.

First Noha called at about seven o'clock. Very foggy. Returning to camp from the ridge did not take very long. We should be able to make the summit easily tomorrow if the ridge trail is all as easily followed and as good as we found it. We will take our blankets, and grub enough for three or four meals. I have a pound and a half rolled oats can full of rice pudding and just boiled rice. We have a can of beef (one pound), and one of beans (one and a half pound), which should keep us alive for a little while at least. Lunch will consist of Noha and rice, and the little hard tack that remains. May we have a good clear morning! At least I should enjoy looking down into Fantana.

An interesting damosel-fly came into camp, so I caught it and folded it up in paper. What wealth of insects one could pick up while knocking about like this! No calls heard while writing this. The fog may deaden distant ones. One is calling near by now, however. May it be the mate to ours, and may it be awaiting us in the morning! It would upset the mountain plans, but would be worth it.

That little densely wooded ravine is about as typical of these higher altitudes as anything we will find, and not a thing was seen or

heard in it. Of course, such a place should be hunted in August. Noha calls from up the ridge. I hope she thinks her husband has gone fishing, and takes up the work where he left off. Had I thought of it in time I might have kept him for a decoy, made a clean bed of fern leaves for him, and staked him upon them. Then to have slept near by would have been quite interesting, and perhaps successful in getting another bird. The calling is beginning to liven up. It continued rather plentifully until I dropped off to sleep. It was very interesting to hear old six-noter come in from the distance. Such music should tend to produce pleasant dreams.

No chance of finding old six-noter; his melodious call just barely reaches me through the fog as he puts out to sea. He passed overhead, but lo! either he returns or another has the same call and is flying about not far distant. He has continued at length while I have been fanning my fire, for I find it was not entirely the good wood which gave light enough to write by on the ridge.

The breeze that chilled me fanned my fire. With like wood, I find it necessary to fan the fire with one hand, pause and write during the brief flare of flame, then fan again. Six-noter still entertains me. After a pause and a fight with my fire he still continues. There I caught another just like him, but it comes so closely that it might be merely his own echo from across the canyon. Is it not possible that he actually enjoys listening to the echo of his melodious notes? In my own favorite echo call, a sort of yodel, I have but one more note than he, and nowhere near the melody. We who dwell so entirely within the confining bounds of our five senses have little right to judge all things by what we can sense. How do we know what might not

be sensed by other animals?

March 12

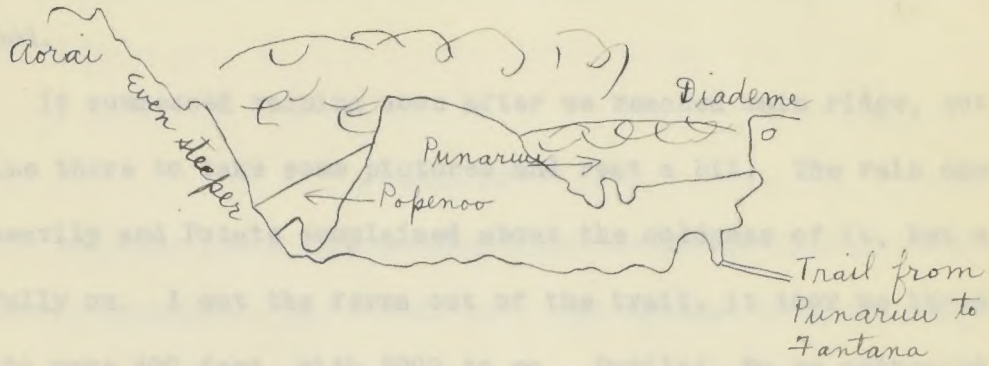
I think I must have awakened at about two A. M., for I have been cutting kindling and wood for fully an hour and a half, and still the Noha are calling. Not many, but a few others besides six-noter. Now comes that short whistle followed by a most mournful groan, just above us about where we found the bird yesterday. I cannot help but think it the mourning call of his mate. Birds called for more than two hours. Still dark. I'm going back to bed.

It was daylight when I awoke. About seven we left camp. At the old Noha diggings were fresh signs, but apparently no bird in the hole. So I rigged up a string snare, which may not be strong enough. While so doing, a hawk flew over us and circled Noha ridge, very low several times. I loaded the gun and then gave Upa's call. No results. So I gave a chicken's call of danger at seeing a hawk, and crowed like a rooster. He came nearer that circle. So I crowed again, and that brought him directly overhead. I dropped him easily. Took him back to camp, drew out his entrails, and filled throat, mouth and body with cornmeal. Returned, and we took up the trail. We are now at Upa cherry tree (?) calling. No results. No sounds of birds.

Two swallows flew over us while at Noha diggings, but I failed to drop either of them. Very certain they were not swifts.

On the ridge after a bit of exertion, for our trail through the ferns and jungle was none too good. A beautiful morning with just enough clouds around to have made good pictures had I brought the ray filter. Tried three,--Aurae, Diadime, and Fantana canyon.

Barometer registered but 3900 upon arriving, but I took it out of case to dry up, and it raised to 3950. So I have yet to beat my Punaruu record. Below is sketch of ridge seen from here, showing where I reached that altitude.



It is now a little after nine o'clock. The hawk took more time than I expected.

Down a swayback or saddle, and up the next horn. Gautier's trail is well grown over with ferns. Thank God, there is nothing larger to cut! I let the boy carry the gun, while with a tipi in either hand, with a side-flung movement, I plow the trail open. It may take two days at this rate to reach the summit.

The hawk: Iris, brown.

Bill, black base below culmen and below horn-blue; culmen, yellow.

Feet, yellow.

753. ♀ Doubtful.

Very tough-skinned and difficult for an amateur to skin. Used up our last candle trying to make feathers look decent. The next problem is to carry these large birds safely down to Papeete. About the only way will be to make a long roll and brace it with

sticks.

We went on up the ridge to an altitude of 4400 feet, where we were at the height of this ridge just before the large drop prior to connecting with Aurae. A landslide down toward our water-creek. Just one or two Noha heard this evening while skinning the hawk and making down bed.

It commenced raining soon after we reached main ridge, but we had time there to take some pictures and rest a bit. The rain came very heavily and Potate complained about the coldness of it, but came faithfully on. I cut the ferns out of the trail; it took us three hours to make 400 feet, with 2000 to go. Futile! So we retreated, after getting most thoroughly drenched. Had clear weather enough to look around again before descending.

Returned directly to camp. Then leaving Potate to build fire and dry things out a bit, I took our last batch of rice and went down to stream to wash it. Climbed up to Noha ridge and searched again for fresh holes. Cut a good chunk of good firewood and returned to camp.

After tea and "pudding" Noha is calling again. I set to work upon the hawk. My impromptu candle is about finished. Well, I'll have to sleep now or build fires in the dark. Hereafter, I allow no less than a full candle per night. Had we one now, I should go up to the Noha nest and look for birds. We would have slept there had the hawk not taken so much time.

For dinner tonight we had "gulose",--beans and rice, and very palatable. Oh yes! I forgot to mention that Noha was very delicious at 4400 feet elevation. We didn't have the nerve to tackle eating the hawk. Monday morning will about finish our grub entirely, and so

we will retreat to fei and oranges. The immature fei here were certainly disappointing, and I had banked on them.

A very clear starlit night. Several Noha calls were heard after retiring, but not noted as unusual. Some were close by, so there is some hope of there being a visitor at the old diggings in the morning.

March 13

Noha was heard this morning sometime before daylight, not noticeably plentiful, but it may have been I slept more soundly than usual. Rain commenced before daylight and continues until late in the morning. Unless we have clear weather it certainly will be a problem to get the two large birds down without wetting them.

The rain has continued all morning. It must now be noon. Not a sign of bird life. We have not yet gone up to the diggings, but must go soon, rain or no. I hope we have clear weather tomorrow long enough to get down to the Upa trees, where we will pause briefly till Tuesday.

Rain continued until about three P. M. It saved hauling water to camp and washed the dishes for us. After it ceased, a few myna birds were calling not far from camp. I went up to look over the diggings, but if any birds had been there during the night, all sign of their visit had been obliterated. Just above the fei there were holes going under a tree stump into which I had poked with no results. Yesterday, returning to camp, I placed fern leaves before these holes. One this afternoon had been moved and lay quite a ways down below the hole. The hole is large enough for Noha to enter, with no room to

spare. I think more than likely a rat is the possessor of that home-site, but will have more evidence in the morning.

We made two meals of a can of pork sausage today by stewing it until it flavored our goulash for breakfast, and then removing it to flavor our rice for dinner. We finished our rice "pudding". We still have enough sausage to flavor the breakfast rice, but our noon meal will be nothing but straight rice and tea. Dinner tomorrow I hope will be upon fei, and if the doves prove sufficiently common, we may remain more than one night with them.

During the night, one or two birds called not very far away. There was nothing unusual, however. One occasionally close at hand.

March 14

Heard birds calling near by just before daylight. Packed everything ready to move; then went over line of holes, and, finding no signs of life except in the one which I firmly believe to be a rat hole, we took up snares and returned to camp. I induced Potate to use a pole for his pack. He chose not to carry the birds so I tried them on my shoulders, but soon adopted the Tahitian style of a pole, which works excellently.

The sun is shining but showers are threatening. Showers prevail around Aurae, sunshine on foothills and Papeete, cloudy and misty here along the ridge. We will probably reach Upa trees shortly after noon. Pole carrying is not at all bad--oh no! My shoulders are now good and sore. With frequent rests, however, we have managed to get pretty well down the little creek where oranges and fei grow in abundance, but are gathered very regularly by the boys from Pirae. There

are some up here today, one carrying a load I could not lift out of the notch in the tree trunk where they rest their poles while loading them.

As soon as we reached this fruitful region, the chirping of myna became very prominent. At the first orange tree we dined luxuriously upon some almost ripe ones. I photographed Potate up the tree. We took thirteen and added them to the light end of my pole. A little farther down we found three discarded bunches of fei which we appropriated, and they did add weight to our load. At first water, we ate lunch of rice--sausage stew. Have been calling doves, songbirds and jungle fowl--attempting to during the frequent rests.

While resting, a dove answered my call, so we went after it. Successful. It came into a tree over head and peered about curiously, searching the caller. Plenty of fei being present, I left Potate to build a house where we had halted, and came down trail to hunt doves. Along the trail was a tree just within nice auxiliary range, so I sat down and called repeatedly. Finally a pair of doves flew over me and lit in a tree just a good large shell range. Dropped one, and the other flew into a tree overhead. Got him with auxiliary. How curious they are! I hunted down trail to the breadfruit trees, where I missed a long shot at a dove, and also one at a kingfisher. Found a freshly fallen breadfruit, and so we will have quite a varied diet. Elevation is 2000 feet.

At camp I found that Potate had put the fei leaves wrongside uppermost on the house, and had not selected the best for the lower layer, so I had fears of a leaky shelter. While skinning out the doves, a shower came and proved my fears well grounded. I hurriedly

tried to remedy the trouble but still left a few leaks. The rain did not last much more than an hour, however, and all went well during the night. Potate had considerable difficulty in getting his fire to burn, but at last succeeded. When it grew too dark to work on the birds I joined him and found him cuddled up beneath three or four leaves, tending to the roasting fei and breadfruit. What a delicious meal they made, just picked and eaten by themselves while hot! Very tasteful, and the breadfruit was sweet and delicious. Oranges for desert.

March 15

All evening a dove cooed nearby, our first kill, no doubt, being its mate. Late into the darkness of night and long before daylight I heard him calling. But he is too shrewd to come when I beckon.

The myna commences its noisy chattering very soon after daylight. They seem to thrive well upon the ripe fei. Many an otherwise good bunch is spoiled by the holes they pick into them. The natives might well have been stung once in a while by wasps, rather than to be struck such vital injuries as the robbing of this, their staple food. How foolish human beings sometimes are to fear wasps, snakes and other beneficial things merely because in self-defense they have a formidable weapon and use it. Have decided to take our time down this valley, hunting doves while we rest, and perhaps going on this afternoon to Papeete, lest Mr. Beck has something planned for this week.

Have descended to 1600 feet without succeeding in calling a

dove, though several answered my cooing. They are a bit wary along the trail. The natives are this high already this morning, yet some people call them lazy. Men who would never venture into the mountains except in automobiles call these marvelous mountaineers indolent and shiftless merely because they will not adopt civilized slavery.

Doves answering my cooing led me down trail from the packs. There I left the gun and hunting jacket while we returned for the loads. It is a poor hunter who has not his gun at all times, for while at the packs we heard a new note amongst the chatter of myna. Sucking upon my hand brought a cuckoo, so I judged, into the tree top overhead. Potate rushed back for the gun, but was too late. We followed down into the Humatu valley whither he had flown. After continued calling he lit on a tree within range and I got him. Sure enough, the cuckoo! From his call I believe it the same bird I heard at Vaihiria last December.

Elevation 1450 feet. Another calling. Myna and Ruro (kingfisher calling). Doves present. He quit calling and nothing else came near. At next pause to call, after taking up trail with packs, a hawk passed near tree tops but failed to reappear. Doves still cooing and myna. Rain threatens. As we come out of the wet-belt foliage and get a view of Papeete, half a dozen tropic-birds are soaring about far below us in Humatu canyon. After prolonged whistling, like Mr. Beck calls them to a vessel, five came and soared several hundred feet above me. Here the only bird life nearby is the red-rumped weaver-bird, which eats the seed of a tall plumed grass.

As we went down the ridge, the tropic-birds became so numerous

that I again tried the calling and succeeded in getting a youngster to come over me close enough to drop him. Others came around when he raised a fuss, but the boy was unable to take care of him in time to let me get reloaded. Stopped there for lunch, and during the eating thereof called several over me, but only one came within dropping range. An old bird with two good tail feathers. Both. P. lepturus, yellow pitted, "Petia" Tahitium.

We are at last down to the mango trees with our light (?) packs. How do these natives carry the loads of fei that they do? Some must weigh very near 200 pounds, yet they will come down over this same trail the same day they go up. It is but a matter of hours for them, their rests being short. It has been a day nearly for us and the rests altogether too short as long as they were. Like the boy Ivi, I am "Mavivi" in the head and back and on both shoulders to boot. I hope we can find some conveyance from Pirae in. Unable to get anything until we reached the race track, where a boy came along and gave us a lift with the loads. Took the birds down to Mr. Beck's in car, being too tired to walk and back to hotel.

March 16

Skinned out cuckoo and tropic-birds and made up three doves. Had a difficult job in washing off one tropic-bird, bloody and dirty.

March 17

Spent day preparing to sail on schooner "Pro Patria" for Tubuae or Austral Islands tomorrow.

Myna birds are feeding full-grown young. One stole a whole

bun off a table of the dining porch. She was very cautious but bold.

March 18

Managed to get everything ready and aboard soon after noon. For this trip I have one volume of Polynesian researches, Strimpan's Tahitian Grammar, and the French Missionarie's Grammaire. Also Campbell's Botany, and Hegner's Zoology. Shakespeare was left behind. I have brought the microscope and plankton net along.

We were due to sail at four P. M., but must wait for a new engineer as the wife of the regular one just got conveniently sick. May not get away tonight.

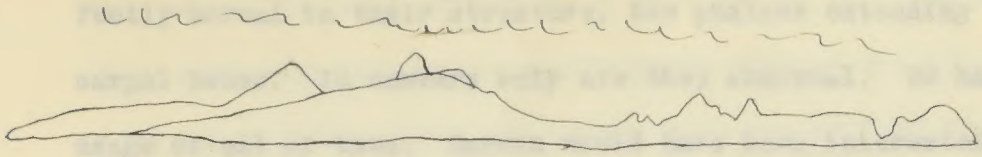
Pulled away from dock at 5:48. A large fluffy blanket of cloud caps the mountains. Myna and pigeons flying about the buildings near wharf. Our anchor holds us firmly, refusing to be hoisted after half an hour's efforts. Saw a bo's'n above the village and a reef heron around shipyard point. One hour at the anchor. Three anchors were crossed, that of the "Moana", a little thirty-foot boat, and ours, a weight which is taxing our donkey-hoist engine extremely. One anchor has been disposed of, and the second almost. Ours is next in order.

Almost dark. A wandering tatler heard. We sailed away shortly after seven; got through passage about 7:40, using engine through calm water between islands. A beautifully quiet sea, always appreciable at the beginning of a voyage. Starlit night; a little cool towards morning.

March 19

A few clouds about the horizon this morning. Tahiti can be

seen rather plainly north by west.



Sunrise at 6:21. Still a calm sea, the engine being used alone. Calmness prevailed all morning. Sun very hot. Cleaned and oiled all the guns and strung labels. Very few birds about here. A few shearwaters of genus Pterodroma.

Long. 150.20 W. Greenwich. Lat. 19.04 S.

Strung labels and slept. At 4:00 P. M. sky overcast, with light leaden clouds. No breeze, very still sea. Few birds present, only one or two shearwaters of doubtful species being seen at distance.

The evening came along with a glorious coloration at sunset. Still calm and cloudy. The ship rolls considerably on the swells. Nothing in the air or ocean was visible.

Rain about midnight drove me below, but my upper berth with an open window is not at all stuffy.

March 20

The engine was started again at 5:00 A. M. Morning clear and calm. One black shearwater observed. Bo's'n birds about later on. Bird life noticeably scarce.

Our Sunday dinner was exceptionally good. We still have ice for the drinking water. Chicken, currie and rice, preceded by a delicious crab salad and supplemented by splendid newly baked bread, made a real Sunday meal. Quince jam for desert.

In the afternoon Mr. Beck photographed the six-fingered,

seven-toed sailor aboard. All his superfluous appendages are perfectly normal in their structure, the phalanx extending to the metacarpal bones. In numbers only are they abnormal. He has perfect usage of all of them. Darwin would have been interested in him.

A large bo's'n bird, red-tailed or red-billed, was at rest on the sea off the port rail some hundred meters. He flew away as we drew abreast of him. A shearwater, black, was seen at the same time.

March 21

Island of Rurutu sighted ahead about fifteen miles this morning. Small black shearwaters, and a larger one with light breast present in fairly noticeable numbers. The engine stalled for an hour or so, but we are again under way at 8:45 A. M. The sea is extremely calm today, almost glassy. One tropic-bird was observed, but nothing else except shearwaters.

Six-finger, seven-toes is pumping water: he holds the pump between his first toe, which is like our big toe, and the second, while five toes still remain on the ground floor. His thumbs and big toe are normal, the addition being regular toes and fingers. What sort of an oddity is this? Certainly he can use all joints with perfect control. Is he a throw-back to the days prior to our five digits? If so, it would be back into Paleozoic times when we possessed many rayed fins.

Unless for some reason or another the birds are in close to land, or else out in the other directions, this is not going to be anything like a profitable collecting trip. Let us hope the land

birds are plentiful, but with duck hunters, other birds have no doubt been taken, and so I anticipate a poor day of it. The sun is exceedingly calm with only great swells which lift us and sink us about every ten seconds. Have not seen a bird for half an hour by the watch.

Flying-fish are very scarce this trip,--just saw one, the first one seen today. A fairy tern breaks the spell of no birds and passes on to the north'ard.

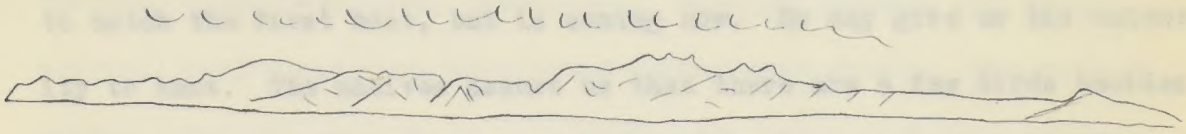
I was reading in Ellis' 'Polynesian Researches' about native canoes coming down here from Tahiti. With neither compass, sextant, nor chronometer, did they know where they were going? Or was it but one chance in a thousand that they would sight an island? How many were probably lost at sea? The strangest part of the Polynesian migration is that it came against both the trade winds and the currents. The New Zealand Maoris followed a much more likely course from Tahiti there. The Mormons believe through revelation rather than science that these races are descendants and migrants from America, via Hawaii. I would be more inclined to believe the American Indians were in some instances at least emigrants from Polynesia, although the languages are so widely different that this is doubtful. If Java, the home of Pithe canthropus , was near the source of the human race, it is only to be supposed that emigrations radiated from there by land and sea. Surely the American Indian far more closely resembles the Polynesian than any other race I have seen. Their resemblances to certain types of the Tahitian are very close. The complexion is almost identical, the features much the same, except for the high cheek bone and eagle-beaked nose; but these are found in some Polynesians.

The customs of tatooing of the Requa Indians and the Maori married women is a surprisingly similar case. The nose rubbing custom of greeting likewise makes me think there is a relationship.

Twenty minutes since that tern passed, and not another bird observed! Where are the sooty terns and boobies? While we were down in the hold this morning, says the Captain, about twenty birds were seen in a bunch. We thought there would be more, so went on getting our stuff out of the sacks.

Forty-five minutes since the white tern was seen, and no birds! We will very likely eat breakfast aboard ship now just before we arrive at the port. I believe we anchor outside at this island.

There appears to be a well-wooded belt next the sea level which extends two or three hundred feet high and farther up the valleys. The summit looks barren, but is more than likely dry-ferns and shrubbery or even thickets. Scattering trees range well towards the top of the lower elevations and to the base of the one high peak. Clouds hang above the island at about 2000 feet elevation.



More than an hour and a half passed before we saw more birds. Approaching land about five miles off, a noddy tern passed us and a flock (very small, perhaps a dozen) of fairy terns and three more noddies pass our bow and go westward above a school of fish. Can see a frigate-bird towards the island.

Within a mile or two of the island one lone noddy flits across our course. The east point of the island is formed by perpendicular

cliffs about two hundred feet high, very much resembling those at Makatea. Just west of the village towards which we are heading is a similar headland. These cliff rocks are full of caverns, and from here appear to have been coral reefs, since elevated. I hope to get time and permission to explore around them for nesting birds, but that will not be today. We stand off and on tonight, so must return to the ship at 5:30 P. M. to catch the boat.

Heavy rainy looking cloud above the land. The village is very small, a Protestant church and a dozen buildings all nestled in the green foliage beyond the strip of beach.

A bo's'n bird, after flying about a bit, ended at the point of the cliff. Certainly there should be some manner of nests over there. Near the cliffs west of town are three more bo's'n birds flying about. There are probably nests there.

Ashore: A dozen myna birds about the church forewarn us that land birds may be scarce. The administrator is not here, an unlooked for delay ensues. The gendarme on the ship was too slow to catch the first boat, but is coming now. He may give us his authority to hunt. The natives assure us that there are a few birds besides the mynas on the island. Hard to learn just what they are. I simply must learn the Tahitian language. It would help us amazingly.

Slight shower while we wait. We follow the gendarme to the administrator's after a short wait. Just before arriving we saw a cuckoo in the cocoanut trees. Rather sultry.

Along the beach around first cliff point. Obtained golden plover, wandering tatler, and blue reef-heron. The noddy and large tropic-bird are present about cliffs, but we were unable to reach

them. Just before arriving at next rock-bluff point obtained noddy and gygis tern, latter with white shafts in tail feathers. More tropic-birds present at this cliff.

Followed a trail around and over to the summit of one of the rocky promontories. The trail led through beautifully timbered country, hibiscus, pandanus, cocoanuts and other things which should have been just right for warblers and fly-catchers, but not a sound of anything was heard except the noddy terns, a few of which came over me as I called. Returning along the trail cutting across the point of land behind this promontory at the junction with the trail back to the harbor, I killed two white terns but one of them hung high in a tree and we failed to get it.

My surmise about a scarcity of birds here is proving correct, because Mr. Beck's lone specimen was the wandering tatler. Stokes says the cuckoo is the only bird the natives know about. Well, we have tomorrow to find out what we can. The Camarina, Iron or Sandalwood tree is the scattering one I noticed ranging up the slopes. Vanilla, Taro, Cocoanuts, Bread-fruit, bananas, oranges and other tropical food-plants are cultivated rather extensively. The soil is rather black and well mixed with limestone, apparently very nutritious.

Skinned out the birds in the evening, Mr. Beck's ability greatly amusing the Captain and crew. The plover and tatler were exceedingly fat. Mr. Beck's tatler was not in the plumage of summer as mine was. Stood off the land this night letting the light breeze take us out a mile or two during darkness. A very calm, cool and clear moonlit night. Could see the land all the time very plain-

ly. Heard no birds during night and was awake aplenty.

March 22

Off this morning about six o'clock. Beck went westward with camera and gun; I retraced yesterday's trail and hunted on point beyond yesterday's work. A shower as I passed through the village drove me beneath a porch. The young maiden there fled hastily. They wear but a very thin dress here, and are, I think, better looking on the average than at Tahiti. There is one who hangs around the beach most of the time. She is young and overly plump but not bad looking for a Polynesian.

In a combined cocoanut-vanilla-banana field just beyond the village where the road passes the first Taro beds I saw a cuckoo. After following him towards the village I got a long auxiliary shot, but did not hurt him. Too near the tern to use large shells. My boy of yesterday did not care to go today. Another shower has treed me in a hole beneath a maupi trunk on the cut-off trail just beyond the large taro beds. Quite a shower.

Myna bird heard. I saw two gygis terns perched upon a tree branch, so I crept over the ridge and down upon them, shooting them from a distance without getting them very dirty. Two others were called within auxiliary range, but, winging them, they got all bloody so I left them. All four were of the long-billed, black-shafted tail variety. They are hovering about the tree tops here, as elsewhere, in twos, threes and fours. The watermelon I ate yesterday on the promontory has kept me quite sick since one o'clock this morning.

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Leading down the ravine, at the head of which the terns were, I have passed through a long string of taro beds with standing water in them, but no signs of rails, sandpiper, nor ducks. This swale led me to a cliff of coral rock in which was an enormous cavern fifty feet or more across the mouth and as high; the interior was filled with caved-in boulders of enormous size. While looking it over a tropic-bird, yellow-billed, came in. I forgot that I had placed a # 6 shell where I usually carry the auxiliary, and fired at close quarters, ripping him wide open. Am afraid that no amount of work can save the skin.

I explored the cave which goes on back into darkness. Found nothing of bird nests except a hole in a rock in which is black dirt sticks. On one rock were the bones of a bird about the size of this yellow-billed tropic. They are very old and decayed, being slowly built into the mass of rock,--a fossil for future geologists. The roof of the cavern is a mass of stalactites, some of considerable length, while stalagmites stud the rocks below in many cases. Encrustations of crystalline limestone, clear in most cases, chalky in others, and tinged green in a few, are common where drippings occur. The remoter depths are extremely beautiful. I am sorry I have not a flash to explore farther.

After lunch and a cocoanut, I proceeded to the point worked from behind yesterday and assailed the face of the cliff. I reached the cave at an elevation of at least one hundred feet above the surf. The floor of this cave could be easily walked on, although it sloped decidedly inward. The floor consisted of decomposed limestone, and in several places I found a soft dirt into which something had

burrowed, much resembling shearwater holes. No fresh tracks were evident in the soft dirt. I prodded all of them and dug out a couple which showed no satisfactory results. It was too dark in several places to see tracks. After finding nothing in the cave, I came out on a prominent rock and called tropic-birds for an hour or more. Two came within range but I missed them. Both red-tailed, as all five or six flying about this point appear to be.

Returned down the beach and met Mr. Beck at first promontory where I had seated myself upon a slab of marble. Later I found a ledge of metamorphosed coral rocks adjoining a bed of lava, which probably accounts for the marble slab. Mr. Beck having gone far around the island the other direction found but the reef-heron and tatlers. While we were indulging in a drink of cocoanut, a reef-heron came around the rock and I took far too long in shooting him, so Mr. Beck said.

I am at the boat now with fourteen assembled to overhaul me. The young lady who took the prize this morning for beauty is here in a pario, which falls far below par quite often. Pario and half length skirts are the general run of clothes, although two of the young ladies are in full gowns, and one has apparently put on her best for the occasion. Poor thing! The pario gets all the observation. The V-back of a ball gown has nothing on her of the pario; it has no back at all. Alas! she has left my admiring throng and is walking with steady tread out over the sharp-pointed reef to where several natives are fishing; and now she picks up a pole and joins them where the surf is roaring upon the outer fringe of the reef.

Shot a noddy tern from here, and had an opportunity to shoot a gygis, but resisted. While I was here, four tropic-birds flew off towards the west-point, just this side of town; now two of them have come back, and four are again (five) circling above the point and honking like geese.

During the day a stiff breeze has come up, and it will be rather dizzy work skinning birds this evening, I fear. The schooner comes in close to shore, but alas! no boatmen are here to meet her. Now she comes up against the wind,--laying to--I think they term it. Now the sails fill out and she puts out to sea.

We went aboard at a little before five, and Mr. Beck came down to shore as we left. I missed two herons near boat landing, long shots. Skinned out the noddies and reef-herons tonight. Very rough for working. A heavy wind preceding squalls kept us all below deck for the night. Stood off against the wind.

The road to Aviri (?) leads off behind the churches and immediately strikes upwards. At first it is a red slippery mud, but later turns to chocolate mud, and then above 350 feet becomes red again and not so muddy as lower down. The ridges are covered with ferns and grass with the iron wood scattering on them. The canyons are filled mostly with hibiscus. Thickets clear beneath.

March 23

Set in towards land at four this morning. At sunrise, gygis and noddy terns were seen about ship. Plans for the day are for me to cross the island and pick up ship at Aviri this afternoon at three o'clock. Small flocks of fairy terns here and there, about

half a dozen to the flock. The road zigzags up a ridge and adjoining ravines.

In the creek beside the road some elderly and buxom matrons were bathing, with parios on about their loins. If they had been young and graceful it would have been tempting to give a second look. Near the top of the ridge I met another elderly lady hiking overland with nothing on but the pario. A man came up on a pony. One passes now running his horse uphill on the lope. For saddles they use the inevitable fei or banana leaves, padded between two sacks. Several horses on the island. The women ride a good deal too. A rope of the "Buran" bark braided and half hitched around the under jaw serves for a bridle, always being used double, as they have no idea of neck-reigning. Horses are poor and scrubby here, as elsewhere, but there is more grass here than I have seen on any other island. Two girls just passed on one little pony. They would weigh at least half as much as the horse.

From the summit, elevation is 500 feet. Most of the island appears to be fern-covered ridges. The peak is composed of a ridge of hard rock. Coming up the grade is a very peculiar procession: two men, one afoot and one riding; three women, one riding and two afoot; and two children riding. One of the pedestrian ladies is chanting a wailing lamentation of a most mournful nature. She ceases as they get closer. It might have been a song. The eldest gentleman came over and greeted me with a handshake. The girls (they were all young) seemed curious to come over and investigate me, but he told them to "Haere". Now four fellows are coming with pack horses laden with taro roots.

Rocky ledges crop out in a few places. At one place large, black lava boulders strew the slope. There is nothing resembling a crater. The island looks to be geologically old, as the valleys are of the broad-V type and the ridges rounded off. Red soil predominates. White gygis terns flying about are the only signs of bird life.

Came across a large boulder which appears to me to be granitic, lying on the ground. Above the trees in the canyon below the road, the noddy terns are quite numerous, but none came close enough to get. Nothing of the cuckoo down in the canyon, and no trail, so returned to road. The taro beds produced but the wandering tatler and myna.

I am having a hard job getting through the village. At every house I must stop and drink the juice of a cocoanut. Now they have invited me to eat here. In the meantime, the old man of the family takes me down the beach in search of birds. Wandering tatlers first appear. Got one in good summer plumage. After crawling through some rocks, I scare a blue heron around the next point; I went after him, and shooting there rouses three or four from the trees on the cliff overhead. One was low enough to wing; the rest go around the next point and take up an inaccessible position where all approach is open, flying before we get within good range.

Returning for lunch, we see nothing except a yellow-billed tropic-bird, too high to reach. But at the stream's mouth is a reef-heron, and I make a very poor still shot at him, greatly amusing the natives. My host has a family of a dozen at least, if they are all his, from a married one down. I cannot find anyone who

knows where a cuckoo can be obtained.

Had a splendid lunch of fish, tame duck, taro, watermelon, cocoanut, and banana at one Charlie Degge's residence. His father was American. They have here a black, heavy rock, which they term "Magnesia". I have a sample of it. They are shipping a box of it to W. J. T. Williams of Papeete, perhaps the dentist. Certainly an island with such a varied geology as this has might produce something worth while in the engineering field.

Finishing lunch, the old Tahitian (he married a Rurutu woman and has lived here twenty-one years) and I came out along the beach in the other direction. Got a reef-heron at mouth of stream. Plenty of tatlers along beach and reef. Around the point, and tropic-birds flying about next rock, where we came only to have them fly away. Five small gray terns flew overhead, high up; no more seen. Noddy about cliff and a frigate high aloft.

Down by the cliff I got two reef-herons with breast feathers well worn out. Later, three of the little gray terns came back, and one came low enough to shoot.

A pair of frigate-birds are hereabouts; a noddy tern has been chasing him as blackbirds do a hawk, until at last he has gone out to sea.

The ship comes around the point, so I hunt back along the reef and get two more herons and a tatler. The boat has two trips to make, but I stopped long enough to eat some more dinner of duck and taro and it was almost fatal, for the boat had left. Running out on the reef alongside the channel, I caught up with it and they came over and picked me up.

The channel is an intricate one, about half a kilometer long, and not much more than five meters wide; yet a ship that will almost fill it is being built on the shore. Labor must be dirt cheap to pay for building a ship in so out-of-the-way a place. The ribs are of iron wood, which is plentiful. The wind has gone down, now that we are about ready to sail.

The extra finger of our sailor appears to be between the third and fourth normal digits. I wonder what such an addition would do to a pianist, help or hinder? A fair wind, but not very strong. A beautifully clear moonlight night. Too much confusion aboard tonight to skin birds, so we left them for morning.

March 24

No land in sight this morning. We skinned out the six reef-herons and the gray tern. About noon, two or more noddy terns were seen, and Mr. Beck announced that land must be near. Later, it was discovered off our port stern. We were about opposite it when the birds were observed.

About two o'clock, we landed and proceeded to the taro patches which comprise the upper extremities of a large basin of swamp, apparently an old crater or lagoon. In the latter case, an elevation of the land would account for it, and such seems the evidence along the shore. Mr. Beck went off with a native. The parakeet was the first bird to answer sucking noises; they came in pairs. A warbler was next. Where I am writing notes, there are three of them hopping about in the bushes. They feed in the marsh mud, and search the tree branches carefully for insects.

While scrambling through a high rank weed, which looked like a primrose and which has overgrown neglected taro beds, I was surprised to hear rapid wing beats. Turning around, I saw a duck departing from the high weed at a little distance; but he was too far and conditions not favorable enough for me to get him. Saw any number of the warblers throughout the swamp and in trees adjoining. The parakeet is found in the taller trees and is very easily called. This bird we hear is "tabu", being the chiefs' manu. They are seen about the village as much as elsewhere. While at the boat waiting for the stragglers, the fairy and sooty tern, reef-heron, and tatler were observed. The tatlers flushed from the taro beds whenever a shot was fired.

March 25

The people here are a little different to the Tahitians. Instead of one man putting two good loads on the ends of a pole and shouldering it in the middle, here they put half a load in the center of a pole and two men shoulder the ends of it. The children carry water this way too.

Followed a cuckoo down from the trail, but did not get within range of him. Skirted the marsh to the left, seeing numerous warblers. Came upon Mr. Beck at further end of it; I cut back through marsh and he went on around. Just a short ways from where I raised the duck yesterday one raised today, and this time I dropped it, but it fell into some rank weeds and grass. Very likely it was but winged, for, although I systematically searched the old taro bed into which it fell, I failed to find it. At first I listened for a sound of it escaping,

but I neither heard anything nor saw tracks.

Again surrounded next taro-rush bed, and at an entrance to a pig den, rocky, cavernous, and jungly, I obtained one of three parakeets. Penetrated the pig den a considerable distance and then followed a cuckoo off into side dens. Got into a labyrinth of broken boulders of coral rock, on top of which grew trees and brush, while down in the small pockets of the maize grew bananas, papiros, and cocoanuts. Had a ripe papiro for lunch.

Got out eventually and found trail across swamp. Two white terns came over me. I killed one with the auxiliary but he got himself all bloody; he had black-shafted tail feathers and good long bill. Beyond the swamp I commenced shooting warblers, and obtained a cuckoo, although I could not back far enough away from him. Returning down the trail, I picked up some more warblers and found old birds feeding two or three young. Also obtained another parakeet; and down the trail farther a couple more. The auxiliary shells are very defective, and consequently I missed several that were well within range. Obtained enough warblers to fill out the ten birds Mr. Beck wanted. Had twelve with the cuckoo. I gave them to him at the Chinaman's, where I bought some jam, sardines and hard tack for my night's food. Am now trying to get some bananas from a native. Cuckoo's eye is brown, verging into gray.

I put up for the night in an old house beside the rice fields, through which I wandered just before dark hoping to get a duck or a rail. Made a fire of cocoanut leaves and bushes found near the house and baked a bread-fruit and taro root. Both were delicious with a can of sardines and one of jam, with an orange to

finish the meal. Mosquitoes kept me fighting all night. At one o'clock I went back along the trail and got the cocoanuts I dropped last evening.

March 26

At daylight the warblers were chirping about, and occasionally I heard the parakeet and white tern. A flock of terns were seen across the marsh and one duck flew across the flat. After eating, I waded through the wet rice fields, for it rained during the night, but failed to raise a duck or see a rail. Started to shoot parakeets and secured two, a cuckoo and white-tailed warbler. Roul came along and I sent them in with him.

Shot four more parakeets and then reached the opposite village. The first man I saw was the fellow from the ship who is duck hunting. Went with him to the hill top where he said he saw plenty of ducks yesterday. Sure enough! at the tree he designated we roused a duck and I should have dropped it, but missed. He shot too, and the reports seemed to raise ducks in every direction. At least thirty were flying about. Twice they came close enough for shooting and I winged a couple which fell far below in the ravine. Two girls brought up one of them, but the other we could not find.

While I was after it, the other fellow winged one which he finally found by stepping upon it. Tried using it for a decoy. Had some cocoanut wine and ate the hard tack and jam I had along with me. On the other side the main hill I dropped another duck into a taro bed in ravine below; our "supercargo" went and got it.

This chasing around over dry fern-covered, red dirt hills

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This chasing around over dry fern-covered, red dirt hills

hunting ducks is one of the oddest experiences a man can have. The ducks appear to have scratched amongst the weeds in places, much as chickens would do. They are found by creeping upon a a casuarina tree with open red soil near it on the point of the hills. Half a dozen men about the island could keep them flying, and would find it rare sport.

The little warbler is at the summit, the parakeets were well up the wooded ravines, and I think I heard a cuckoo from the hill. Noddy and white terns about nearly everywhere.

Took trail to Mataerani (Anopoto is the old name), but side-tracked into a plantation where we indulged in some delicious pine-apples and bananas. Obtained two warblers here.

I hope Mr. Beck will get a good picture of our landing because it is a very difficult passage, thirty feet wide at the outer point of the reef, but not much wider than the whale boat where we take to the water. The men push the loaded boat to this point and let the drawback of the flood carry it out.

The island of Rimatara has four distinct zones: the dry, fern-covered hill tops where bare red soil is prevalent and ironwood and grass grow; the level swamps where a tangling fern, reeds, and grass grow, and taro and rice are cultivated; the brakes of coral boulders where hibiscus, pandanus, maupi, and other trees and many vines form a jungle; and the cultivated foothills, flats and ravines where cocoanuts, bananas, fei, coffee, pineapple, breadfruit, oranges, lemons and other tropical products are grown.

The coarse-leaved plant, from the blades of which mats and

hats are made, is raised of its own accord in the cultivated belt. A plant resembling the century is grown on the hill tops. The natives make ropes from it. Food is going to waste on this island by the tons. Many taro beds are now unworked.

March 27

Brought the extra gun ashore today and am going duck hunting with the boys of yesterday. I am now waiting for one of them in a native house four meters wide and about ten long, boarded up on one end only, the east. The roof is thatched with pandanus leaves bent over thin bamboo sticks about eight feet long; the base of the leaf for about fourteen inches is below the ends folded above the stick. The lower ends of the base are held by a thin strip of bamboo piercing them. These shakes are shingled with about three inches to the weather, making a thoroughly waterproof roof. The steadying rafters and beams are apparently hewn timbers.

Within now the natives are chanting their hymonic, which is the song our sailors on the "Moana" sang so much. The children here have been cutting up during the service, and an elderly lady just came to chastise them. The service is now being read. This service is following the regular one in the Protestant church named "Ziona Tabu 1857". Why Zion should be tabu is more than I can see, unless, of course, it is some narrow-minded sect who believe paradise is tabu to all non-believers in their particular creed. The crowd disperses one by one or in small groups, as any ordinary Sunday meeting congregation dwindles away. Black dresses are very commonly worn here, symbols of mourning often kept for six months, I am informed.

Nearby the village are two very out-of-place aurecaria trees. Strangely, our duck hunting is not turning out very successfully. The first hill top brought nothing. I shot a couple of scare shots, but raised only a small flock of four which kept well away from me. One of the other men crossed the island and took trail to the southwest. I have covered the points where we found ducks yesterday; also hills to southeast and northwest;at the latter position one duck was seen. Deciding there were no more, I started up the ridge when one flushed and I winged her with a long shot. My two boys were unable to find her, but I sat down to write notes, and while we waited she came out from her hiding place. A third one flushed nearby when I shot this one. I searched for a nest where she raised, but found no signs of any.

Have sent out a call for a general assembly at the cocoanut grove, where four boys and I now are dining and wining upon cocoanuts. One nut is more than a man can drink and eat comfortably. How foolish it is to carry lunches around in such a country as this! Far less exertion climbing a small tree will get food enough for two meals.

At both villages fair maidens requested that I stop for dinner; one adorned me with two large flowers and walked along the trail with me as far as the well beside the first taro beds. At the next village the host of Roul and the other men from the ship requested that I stop for the night. They cannot fathom this coming out in the jungle to sleep.

Out of the taro beds I flushed a reef-heron (yesterday-day-before one flushed from the rice fields), where tatlers are also met

with. The little weaver bird was quite evident and one was tuning up to a considerable song, but not equal to the Marquesas birds nor the Tahitian one. The parakeets were flying about in pairs and threes rather thickly, and I heard them until darkness had set in.

I succeeded in getting well back into the brakes of rock, but observed nothing unusual this evening. My dinner tonight will consist of taro and sardines, fei and jam, baked bananas and papiro for desert, and cocoanut water to drink. One certainly could desire little else. The sardines aren't really necessary, but it is very difficult to break away from habits of civilization. I reached an excellent cave, though it is not serviceable except for a bed.

The fire was easily started by the use of the dry banana leaves and has, I think, thoroughly cooked my meal. There was but one thing the matter with the dinner and that was the sad limitations of the elasticity of the stomach walls. The ripe fei were delicious with an orange; the taro was just right for a starchy filler along with the sardines; the ripe Mexican banana (large reddish-brown variety) was splendid, but the jam was tasteless by the time I got to it. There really is no need of buying expensive food in a land where food is wasting everywhere.

[A Polynesian vocabulary is contained on the last pages of this book.]

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